

SOUTHERN POWER AND INDUSTRY

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MARCH, 1954

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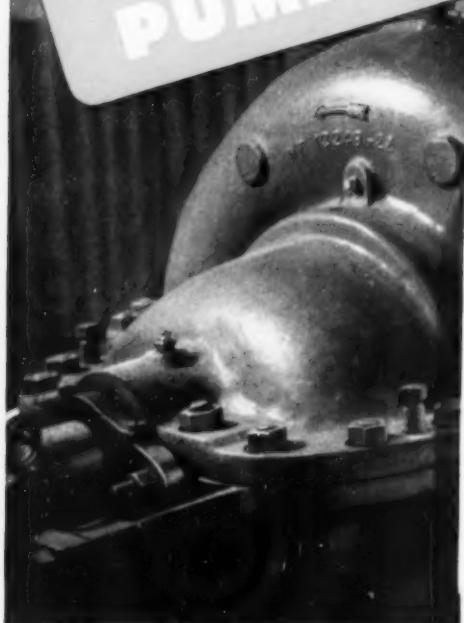
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ALLIS-CHALMERS
Double Suction
PUMPS



CUT PUMPS

Get an Allis-Chalmers pump with:

- **HEAVY DUTY CONSTRUCTION** — Extra metal thicknesses, extra strong parts, no skimping.
- **WIDE MATERIAL CHOICE** — Iron, bronze, stainless steels and combinations to handle practically any liquid.
- **MANY OPTIONAL FEATURES** — Choice of sealing methods and bearing arrangements for special requirements.
- **UNIT RESPONSIBILITY** — Pump, motor and control — a complete unit — supplied and guaranteed by Allis-Chalmers.

FOR ALL GENERAL USES AND MANY SPECIAL PROCESS APPLICATIONS.

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individually engineered by men whose experience in thousands of pump installations will give exactly the right pump for your needs.

Whatever your pumping problem, call your nearby Allis-Chalmers Authorized Dealer or District Office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 08B6146.

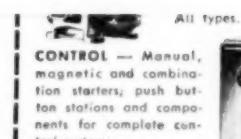
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Volume 72

Number 3



A-4287

LOOK INTO Edward FORGED STEEL VALVES

Edward
INSTRUMENT
VALVES

Fig. 952-3 Series



WY GES

in $\frac{3}{4}$ and 1 in. sizes. Carbon, 13% chrome or 18-8 stainless forged steel body—13% chrome stainless steel semi-needle disk. Female outlets and female and male inlets. Globe and angle types.

sign Features That Keep
flow—Performance HIGH



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Gives You:
THE NEWEST
IN FLOW DESIGN

New flow design advantages are yours—thanks to years of Edward scientific flow research and development. Edward streamlined flow design reduces wear-producing turbulence—adds years of life to seats, disks, stems and other components.

MODERN DESIGN FEATURES

Throughout you'll find such features as non-porous, drop forged steel bodies; 13% chrome stainless steel disks, seats and stems; durable, heat-resisting packing; specially plated gland bolts; self-centering swivel plugs; and others to assure years of dependable service. Edward design also makes maintenance and accessibility to parts simple and foolproof. Write for catalog.

A Product of Edward Valves, Inc., 122 W. 144th Street, East Chicago, Ind.



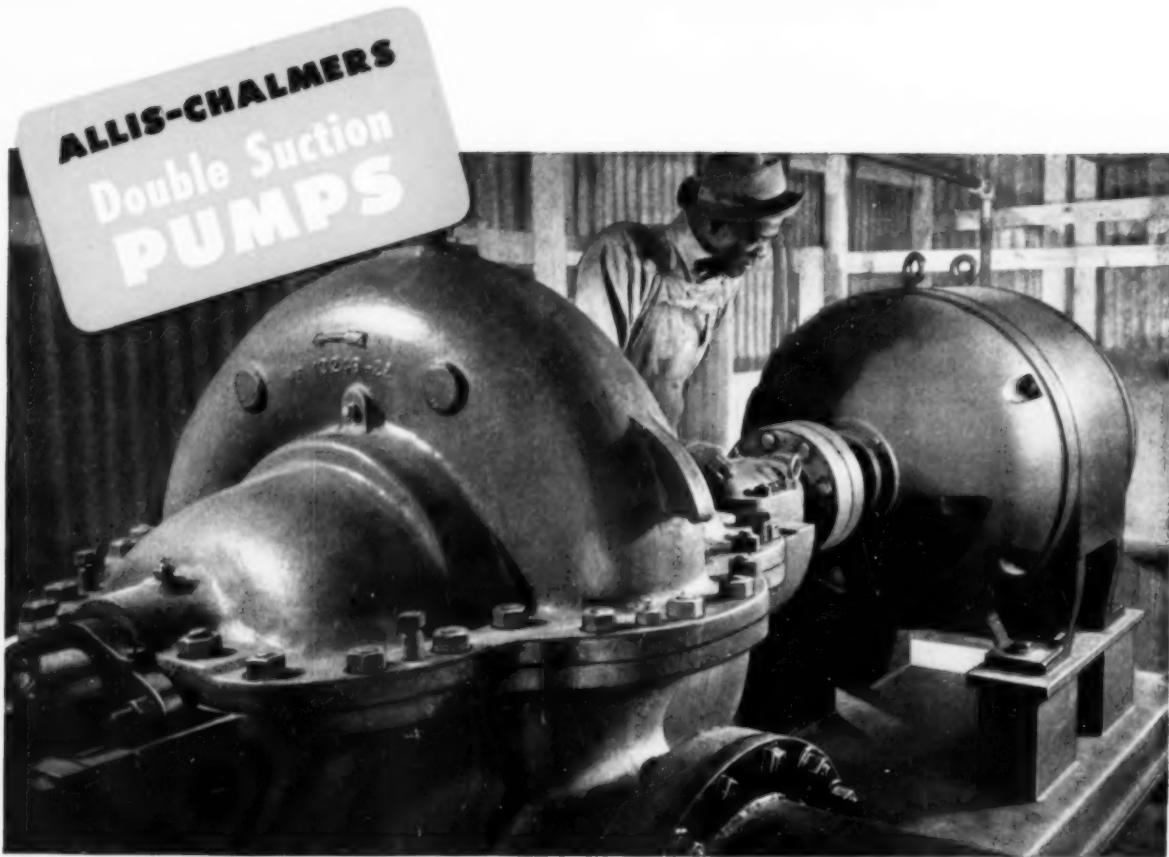
YOU NEED THIS!
FOR COMPLETE INFORMATION on all Edward Steel Valves, write to Edward, Department CP, for 28 page comprehensive catalog #104, there's no obligation, of course.

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Subsidiary of ROCKWELL MANUFACTURING COMPANY

EAST CHICAGO, INDIANA





CUT PUMPING COSTS

Get an Allis-Chalmers pump with:

- **HEAVY DUTY CONSTRUCTION** — Extra metal thicknesses, extra strong parts, no skimping.
- **WIDE MATERIAL CHOICE** — Iron, bronze, stainless steels and combinations to handle practically any liquid.
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Every Allis-Chalmers double suction pump is carefully tested on the most modern electronically controlled pump testing equipment in the industry. Each installation is individually engineered by men whose experience in thousands of pump installations will give exactly the right pump for your needs.

Whatever your pumping problem, call your nearby Allis-Chalmers Authorized Dealer or District Office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 08B6146.

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Volume 72

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CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.



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A-4287

LOOK INTO

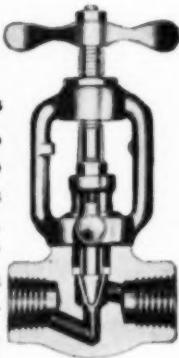
Edward FORGED STEEL VALVES

Edward

**INSTRUMENT
VALVES**

Fig. 952-3 Series

Ratings of 6000 lb WOG or 1500 lb sp at 1000°F, in sizes $\frac{1}{4}$ in. through 1 in. A compact, heavy duty valve with many extraordinary features. Drop forged body and yoke. Tapered 13% chromium stainless steel needle-type integral or swivel stem-disk. O. S. & Y. No bonnet joint—swing bolted gland. Screwed or socket welding ends—globe and angle types. Carbon steel or 13% chromium stainless steel body.

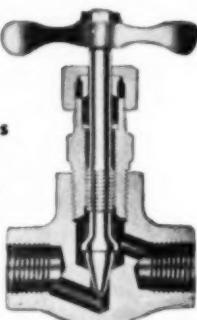


Edward

**GAGE
VALVES**

Fig. 152-3 Series

Ratings of 4000 lb WOG or 600 lb sp at 750°F, in sizes $\frac{1}{8}$ in. through 1 in. Has special tapered body-bonnet thread, joint in $\frac{1}{8}$, $\frac{3}{8}$ and $\frac{1}{2}$ in. sizes so bonnet remains tight. Union bonnet in $\frac{1}{4}$ and 1 in. sizes. Carbon, 13% chrome or 18-8 stainless forged steel body—13% chrome stainless steel semi-needle disk. Female outlets and female and male inlets. Globe and angle types.

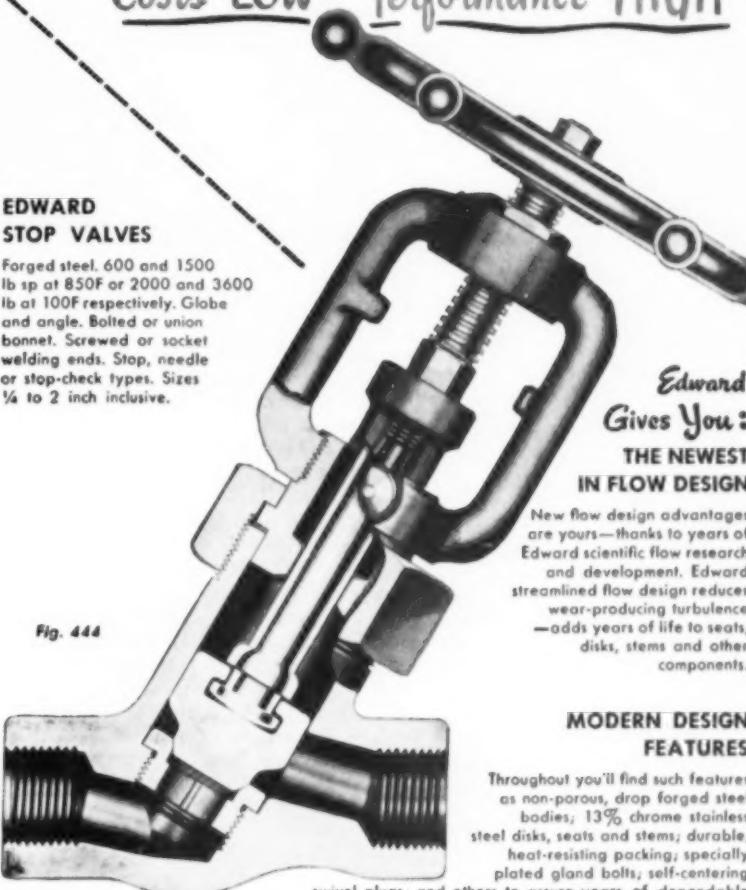


For Design Features That Keep
Costs Low - Performance HIGH

**EDWARD
STOP VALVES**

Forged steel, 600 and 1500 lb sp at 850°F or 2000 and 3600 lb at 100°F respectively. Globe and angle. Bolted or union bonnet. Screwed or socket welding ends. Stop, needle or stop-check types. Sizes $\frac{1}{4}$ to 2 inch inclusive.

Fig. 444



Edward

**Gives You:
THE NEWEST
IN FLOW DESIGN**

New flow design advantages are yours—thanks to years of Edward scientific flow research and development. Edward streamlined flow design reduces wear-producing turbulence—adds years of life to seats, disks, stems and other components.

**MODERN DESIGN
FEATURES**

Throughout you'll find such features as non-porous, drop forged steel bodies; 13% chrome stainless steel disks, seats and stems; durable, heat-resisting packing; specially plated gland bolts; self-centering swivel plugs; and others to assure years of dependable service. Edward design also makes maintenance and accessibility to parts simple and foolproof. Write for catalog.

A Product of Edward Valves, Inc., 122 W. 144th Street, East Chicago, Ind.



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Edward Valves, Inc.

Subsidiary of **ROCKWELL MANUFACTURING COMPANY**

EAST CHICAGO, INDIANA



WHICH WILL IT BE...



INSTALLED
COSTS

PREMATURE
REPAIRS



PREMATURE
REPAIRS

a little more **NOW**—or a lot more **LATER**?

Let's take a close look at this so-called higher cost of wrought iron pipe.

All too often, INITIAL COSTS are used as the only basis of comparison. The fallacy of the initial-cost-yardstick has been proved time and time again in installations where low-first-cost piping has been installed and has failed prematurely. The original installation was quickly made by pipe fitters. But repairs call for hours of work by as many as five craftsmen—pipe fitters, masons, carpenters, plasterers, painters. And labor costs are only part of the picture. The indirect costs of production slowdowns and disrupted routine swell the total of every premature pipe failure. It's easy to see how this first failure can wipe out initial "savings" many times over.

The only valid comparison of piping costs is INSTALLED COSTS plus REPAIRS. This yardstick places the emphasis where it rightly belongs . . . on SERVICE LIFE. In

installation after installation, wrought iron pipe has doubled, tripled and even quadrupled the useful service life previously obtained from low-first-cost piping. All this adds up to one thing . . . the fact that you pay a little more for wrought iron means that you pay a LOT LESS FOR MAINTENANCE. Wrought iron gives you *piping economy*, because it lasts longer, at lower cost per year!

If you are concerned about piping services where corrosion is a threat to durability, you'll find it profitable to investigate the longer life of wrought iron pipe. Our Engineering Service Department will be happy to send you examples of typical wrought iron service records in installations similar to those in which you are interested. Write or call.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Department: New York, N.Y.



Why Genuine Wrought Iron Lasts

This notch-fracture test specimen illustrates the unique fibrous structure of wrought iron—which is responsible for the high corrosion resistance of the material. Tiny threads of glasslike silicate slag, distributed through the body of high-purity iron, halt and disperse corrosive attack, and discourage pitting and penetration. They also anchor the initial protective scale, which shields the underlying metal.

BYERS

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WROUGHT IRON
TUBULAR AND HOT ROLLED PRODUCTS
ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

SOUTHERN POWER AND INDUSTRY

Vol. 72
No. 3

MARCH
1954

NEP



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Editorial and Executive Offices:

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SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E., ATLANTA 5, GEORGIA

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

March, 1954

- PLASTIC PIPE will be used by Carolina Power and Light Company's Wilmington steam plant to conduct corrosive well water. More than a quarter of a mile of the light weight 3" i.d. tenite butyrate plastic pipe (one 20 ft length weighs only 23 lb) will deliver water from source to large tanks where it will be decarbonized. Water is air saturated and contains a high percentage of carbon dioxide.

Pipe was joined together (solvent cement and slip-sleeve couplings) in a continuous length on top of the ground before being lowered into the ditch. Line was installed in less than half the time that it would have taken with red brass pipe, the only other material considered for the conduction of corrosive water.

- ATOMIC POWER cannot be justifiably called "cheap" power under present economic conditions. Before one can proceed with a reliable atomic plant cost analysis, engineers and metallurgists will need to solve many challenging problems. However, none of them are insurmountable and in time they should be solved.

Many of the answers will be found when the FIRST LARGE SCALE atomic power plant, recently authorized, goes into operation.

With the prospect of early development of an atomic power plant, plant engineering personnel will be especially interested in the technical aspects. AN APPRAISAL OF ATOMIC POWER PLANTS, featured in this issue, covers reactions and fuels, coolants, power plant and heat exchanger, and economic considerations.

- FIRST TRANSFORMER shipped in mid-January for General Electric's new \$25 million Rome, Georgia, manufacturing plant, delivered to the Georgia Power Company, was an 18 ton, 5,000 kva unit. Power transformers, rated 500 to 10,000 kva and weighing from 4 to 50 tons each, will be manufactured in the Georgia plant, with a new near-conveyor type system. Over 1,700 will eventually be employed in the modern manufacturing operation.

- OXIDIZING CATALYSTS for air pollution control are still going strong. First industrial installation (Enamelstrip Corp. in 1952) solved the plant's problem of solvent exhausts. Test reports now indicate that the Oxycat unit (Oxy-Catalyst, Inc.) is still removing 99.6% of irritating solvent pollutants rising from Enamelstrip ovens.

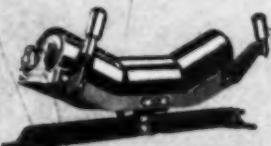
This installation not only cleaned up the air pollution problem but, in the process of burning the pollutants, generated about 8,000,000 Btu/hr of usable heat energy. Enamelstrip has been channeling a portion of this heat back into its plant to run its paint baking ovens and other processes.

(Continued on page 6)

**THERE'S A *Continental* IDLER
for every purpose**



STANDARD DUTY IDLER



SELF-ALIGNING TROUGHING IDLER



SELF-ALIGNING RETURN IDLER



FLAT ROLL



RUBBER DISC IMPACT IDLER



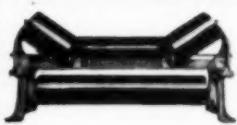
SELF-ALIGNING FLAT BELT IDLER



FLAT BELT IDLER



GRAIN FLAT BELT IDLER



GRAIN CONCENTRATOR IDLER

Belt conveyors are used for handling many types of material. For this reason, Continental manufactures a variety of Idlers each designed to best take care of a particular application.

When ordering your next Belt Conveyor specify Continental Idlers and take advantage of our complete line.

Most Standard size Idlers can be shipped FROM STOCK. Other sizes can be shipped promptly.

Specify **CONTINENTAL**

CG 4804



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**INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY**

BIRMINGHAM, ALABAMA

ENGINEERS



ATLANTA • DALLAS • MEMPHIS • NEW YORK



MANUFACTURERS

facts and trends (continued from page 4)

In so doing, the company cut its monthly fuel bill by more than 90% or \$3,000 a month. This saving paid for the installation in six months. Since then, it has been clear profit.

- TWO-WAY RADIO for dispatching non-scheduled operations of lift trucks, tow cars and cranes, has paid off at Convair in Fort Worth, Texas. While most of the traffic operations are carried on a scheduled basis, there is a great deal of miscellaneous hauling and servicing for which vehicles must be dispatched.

Traffic department operates some 375 powered vehicles and to date 15 of these, devoted to non-scheduled operations, have been equipped with two-way radio. Truck operators can call for a new work assignment immediately after completion of a previous one, eliminating the time and mileage necessary to return to the central dispatcher.

- TEMPERATURE-CHECKING CABLE (plastic-coated copper circuit, with constantan thermocouples every five feet inside a wire rope) has been designed to detect deterioration in stored grains. When moisture or insects are present in stored grain, the affected area will heat. By keeping track of temperature changes, it is possible to know when to aerate or disinfect the grain and thus keep the loss to a minimum.

The PTC Cable Company unit, being manufactured by Jones & Laughlin Steel Corp., can be installed vertically or horizontally in any shape or type of storage bin. In a typical grain elevator, cables are hung down into the bins and the grain poured in, completely surrounding the cable. Thermocouples, every five feet in the cable, indicate the slightest change in temperature.

Other industries that may be able to use temperature-controlling cable would be any that store hydrocarbons, such as coal or petroleum.

- FIRE PROTECTION developments such as high velocity water fog and chlorobromomethane will result in a reappraisal of present fire fighting techniques for utility company plants. Moreover, higher steam temperatures and higher short circuit currents have created greater hazards.

Recent improvements have been spectacular. Tests conducted at the River Junction Steam Plant of the Gulf Power Company demonstrated that the fires most likely to occur can be controlled more effectively with these modern means than with equipment heretofore available.

Official report of the fire tests and demonstrations is featured in this issue of SP&I. It shows that the operation of large overhead fog tips will control a fire on the top and sides of a transformer, regardless of its size. Such a system is preferable, from cost and operational standpoints, to a large number of fixed fog heads surrounding the transformer.

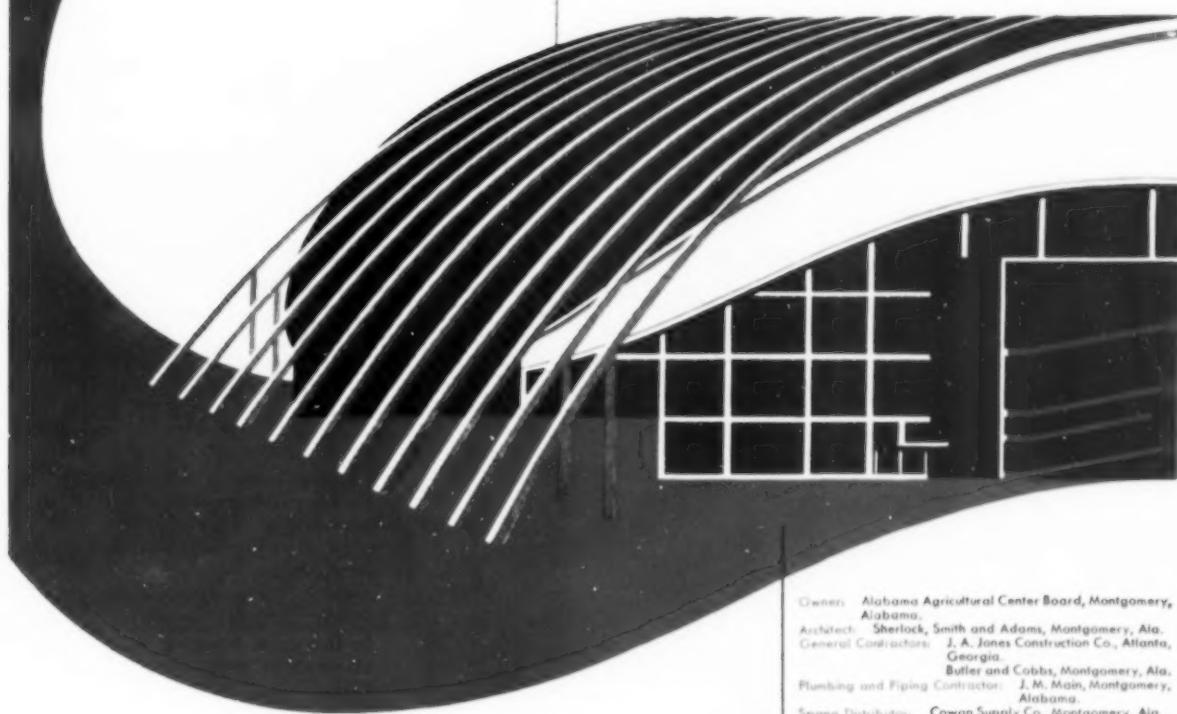
Modern fog system will form an excellent backbone of protection, but first and second line of defense should be portable carbon dioxide and chlorobromomethane units for controlling fire in its incipiency as well as fixed carbon dioxide systems for protection of switchgear.

Write the editors for additional information on any of the above items.
SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

SPANG®

"CW" STEEL PIPE

meets the exacting needs for
Alabama's giant state coliseum



Owners: Alabama Agricultural Center Board, Montgomery, Alabama.
Architect: Sherlock, Smith and Adams, Montgomery, Ala.
General Contractors: J. A. Jones Construction Co., Atlanta, Georgia.
Butler and Cobbs, Montgomery, Ala.
Plumbing and Piping Contractor: J. M. Main, Montgomery, Ala.
Spang Distributor: Cowan Supply Co., Montgomery, Ala.

Curving from the ground like the back of a huge turtle, the Alabama State Coliseum is the largest enclosed arena in the world. In order to build this enormous structure, which seats 15,000 and actually "grows" as much as two inches on a warm day, materials had to be selected which would meet the architect's and contractor's exacting requirements.

Spang CW Steel Pipe was chosen for this unusual project to insure a high-quality, reliable installation. The coliseum, which requires 9,300,000 Btu to heat when it's empty yet needs a cooling system in operation when it's crowded, uses Spang Pipe throughout for its gas lines, water lines and fire mains.

Architects and contractors who demand highest quality products always know they can specify Spang CW Steel Pipe with confidence. That's because the manufacture of Spang CW Steel Pipe is quality-controlled. Every phase of Spang CW Pipe manufacturing is subject to strict inspection, with close temperature limits rigidly adhered to, and only top-grade steel going into the product.

When you specify pipe, specify quality . . . specify Spang CW Steel Pipe.



SPANG-CHALFANT

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New York, Philadelphia, Pittsburgh, St. Louis.

NEWS for the South and Southwest

First transformer shipped . . .

TESTING finished transformers before they are shipped to the customer is an important feature of the new \$25 million Rome, Georgia, plant. Here part of the equipment that will supply power for test purposes is being installed.



General Electric's New Georgia Plant

The first transformer to roll off the production line of GENERAL ELECTRIC COMPANY'S nearly-completed, 25-million-dollar plant in Rome, Georgia,

was officially delivered to the GEORGIA POWER COMPANY in mid-January.

An 18-ton, 5,000-kva, three-phase unit, it was also the first transformer

of its size to be manufactured in the South. In a brief ceremony attended by officials of both companies, the transformer was started on its way to the power company's new Woodward Avenue sub-station in Atlanta.

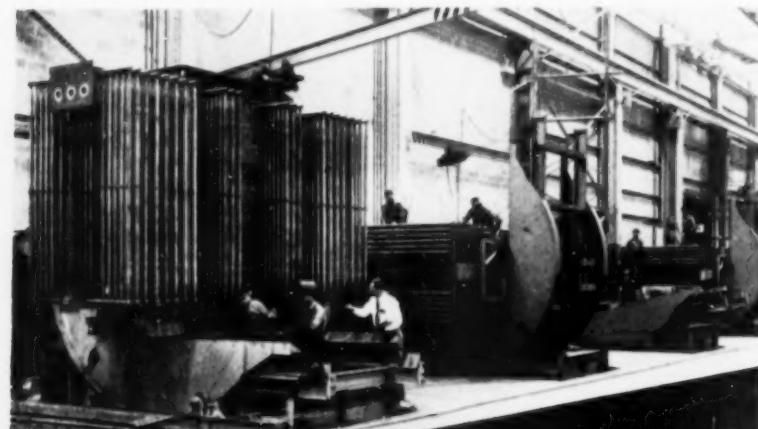
"This transformer," said J. M. OLIVER, vice president and general manager of Georgia Power, "is only the first of hundreds that will roll out of this plant when production reaches capacity. It means that consumption of electricity will continue to increase in this area, bringing an ever better standard of living to Georgia and the South."

ABOVE, LEFT—One of a long row of welding positioners. Transformer in foreground is in upright position; adjacent positioner holds transformer in side position.

LEFT—D. B. Lawton, manager, Rome, Georgia, transformer plant, addresses employees on the occasion of the delivery of the first transformer to the Georgia Power Company. Seated at the right are Hatlee Branch, Jr., president, Georgia Power, and W. S. Ginn, general manager of the G-E Transformer Department, Pittsfield.

D. B. LAWTON, manager of the huge new plant, said construction, which began in 1952, is expected to be completed in the spring of this year. Power transformers, rated 501 to 10,000 kva and weighing from 4 to 30 tons each, will be manufactured with a new near-conveyor-type system.

(Continued on page 10)



here's how
high temperature
piping
can flex
its muscles



Each pipe hanger is scale tested to rigid tolerances by a skilled workman at the Navco plant. After final assembly and inspection, the hangers are carefully crated and readied for shipment.

NAVCO Counterpoise Pipe Hangers

Since high temperature piping has no respect for equipment connections, the entire piping system must flex its muscles to absorb the strain of expansion and contraction. This prevents serious stresses that could endanger the installation.

And how does high temperature piping flex its muscles? With Navco's precision engineered Counterpoise Pipe Hanger—the hanger with a load-supporting effort that is of constant value throughout the range of travel. This permits weightless movement of the entire piping system.

To learn how power plants, oil refineries and chemical plants can have piping systems that flex their muscles, write today for Navco's 12-page Counterpoise hanger bulletin #153.



NATIONAL VALVE & MANUFACTURING COMPANY

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New York • Chicago • Cleveland • Boston • Atlanta • Buffalo • Cincinnati

news for the South and Southwest (continued)

Some 1,700 to 1,800 eventually will be employed at the plant.

The new methods and equipment will make the Rome plant the most modern operation in the transformer manufacturing industry, Lawton said.

JOHN AGER, Georgia Manager of the G-E Apparatus Sales Division, Atlanta, said the new plant "is a good example of the industrial expansion now taking place in the South and the part that General Electric, with its 'More Power to America' program, is playing in that expansion." He added

that the expansion of power facilities here "will help to bring more manufacturers to the South and increase the productivity of existing plants."

W. S. GINN, general manager of G-E's Power Transformer Department, Pittsfield, Mass., said, "This plant is the first we have ever built to mass produce small power transformers and marks a new era in our ability to furnish these units more quickly to supply the needs of industry. The Rome site was selected because it fulfilled the requirements for

proximity to the expected center of shipments, availability of good labor, good railroad facilities, highway, and power supply."

Other executives at the ceremony were: From Georgia Power—HARLIE BRANCH, Jr., president; J. J. McDONOUGH, executive vice president; C. M. WALLACE, JR., vice president in charge of sales; H. W. BOOZER, vice president and manager of finance; J. R. CARMICHAEL, manager of purchases and stores; J. F. PENNINGTON, vice president in charge of operations; and H. M. OLDAM, vice president and division manager at Rome. From General Electric—C. J. HENDON, commercial vice president, Southeastern District; and CARTER REDD, district manager of Apparatus Sales Division.



The LaQuinta plant, on the north shore of Corpus Christi Bay, is operated by Reynolds Reduction Company, a wholly owned subsidiary of Reynolds Metals. Bauxite is unloaded at the pier (foreground) by belt conveyors. With the Reynolds San Patricio reduction plant (background) it is a completely integrated ore-to-aluminum operation.

New Alumina Plant Gives Texas Its First Completely Integrated Aluminum Facility

The LaQuinta alumina plant of REYNOLDS REDUCTION COMPANY, a wholly owned subsidiary of REYNOLDS METALS COMPANY, is now substantially completed and is being operated by the latter company. Located on the north shore of Corpus Christi Bay in south Texas, the plant has a rated output of 1000 tons of alumina daily.

It is the first alumina plant to be built in Texas. With the huge San Patricio reduction plant next door, it now gives Texas a completely integrated bauxite-to-aluminum operation.

Taking advantage of mild Texas weather, all the equipment is located out-of-doors. The facilities are built in two sections, each with a rated capacity of 500 tons of alumina daily. The two sections can be operated in-

dependently, or together, providing increased flexibility.

LaQuinta is designed especially to process Jamaica bauxite. Ocean-going vessels bring the bauxite up a 6½-mile channel 32 ft deep across Corpus Christi Bay to a new pier constructed on the waterfront side of the plant site. Here the ore is unloaded by belt conveyors and stored prior to processing.

Fuel for boilers and calcining kilns is natural gas with plant requirements totaling approximately 20,000,000 cu ft daily. Fresh water requirements for plant operations amount to approximately 2,500,000 gallons each day. This water is drawn from the facilities of nearby Corpus Christi

(Continued on page 110)

FUTURE EVENTS Of Engineering Interest

SOUTHERN SAFETY CONFERENCE AND EXPOSITION, W. L. Groth, Exec. Dir., P.O. Box 8927, Richmond 25, Va.
March 7-9, Fifteenth Annual Conference and Exposition, Kentucky Hotel, Louisville, Ky.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, A. B. Campbell, Exec. Secy., 1061 M&M Bldg., Houston 1, Texas
March 15-19, Tenth Annual Conference and Exhibition, and Refinery Industry Symposium, Kansas City, Mo.

AMERICAN POWER CONFERENCE, E. R. Whitehead, Secy., Illinois Institute of Technology, Technology Center, Chicago 16, Ill.
March 24-26, Sixteenth Annual Meeting, Sherman Hotel, Chicago, Ill.

THE RICE INSTITUTE EXPOSITION OF ENGINEERING, SCIENCE, AND ARTS, Albert Sundermeyer, Gen. Mgr., P.O. Box 1892, Houston, Texas
April 2-3, Fourteenth Biennial Exposition, Rice Institute, Houston, Texas.

8TH ANNUAL INDUSTRY-FACULTY CONFERENCE, Paul C. Koons, Jr., Acting Ass't Dir., Engineering Experiment Station, Louisiana State University, Baton Rouge 3, La.
April 6-7, Conference, "Education and Industry," Louisiana State University, Baton Rouge, La.

SOUTHERN INDUSTRIAL WASTE CONFERENCE, Sponsored by Manufacturing Chemists Assn., Maurice P. Crass, Jr., Secy., Woodward Bldg., Washington 5, D. C.; Southern Assn. of Science & Industry, and Texas Chemical Council
April 21-23, Conference, Hotel Shamrock, Houston, Texas.

BASIC MATERIALS EXPOSITION, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
May 17-20, Basic Materials Exposition and Conference, International Amphitheatre, Chicago, Ill.

WORLD TRADE INSTITUTE, World Trade Committee, Houston Chamber of Commerce, Houston, Texas.
May 17-20, First World Trade Institute, University of Houston, Houston, Texas.

THE SOCIETY OF THE PLASTICS INDUSTRY, INC., Wm. T. Cross, Exec. V.P., 225 Madison Ave., New York 17, N. Y.
June 6-11, Sixth National Plastics Exposition, Cleveland Auditorium, Cleveland, Ohio.

INSTRUMENT SOCIETY OF AMERICA, Managing Director, First International Instrument Congress & Exposition, 845 Ridge Ave., Pittsburgh 12, Pa.
Sept. 15-21, First International Instrument Exposition, Philadelphia Convention Hall, Philadelphia, Pa.

WHY 2 OF DENVER'S 5 REFINERIES SELECTED NICHOLSON STEAM TRAPS

may be important to you



LIKE many industrial plants, the two operations referred to above had been using a considerable number of different kinds of steam traps. Both refineries have standardized on Nicholson traps, for practically all applications, for these basic reasons: Nicholson traps were found to be the most effective in improving heat transfer and in promoting production efficiency. These are advantages which, we believe, are of interest and importance to plant men in every industry. A recent survey showed these Nicholson features to be reasons why an increasing number of leading plants are standardizing on Nicholson thermostatic traps:

- 1) Two to six times average drainage capacity; shorten heat-up time.
- 2) Operate at lower temperature differential; fast action keeps equipment full of live steam; higher and more even temperatures.

- 3) No air binding; eliminate costly fluctuation of operating temperatures.
- 4) Freeze-proof; drain completely when cold;

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CATALOG 953
Contains
installation diagrams and
data for determining
proper size of trap.

W. H. NICHOLSON & CO.

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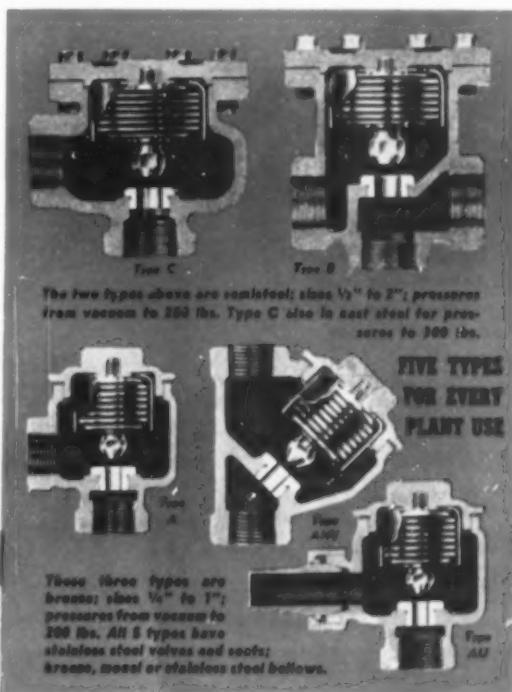
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can be freely installed outdoors.

- 5) Only one moving part; minimum maintenance.
- 6) No need to change valves for varying operating pressures from vacuum to maximum allowable.
- 7) Record low for steam waste; as little as 1%.

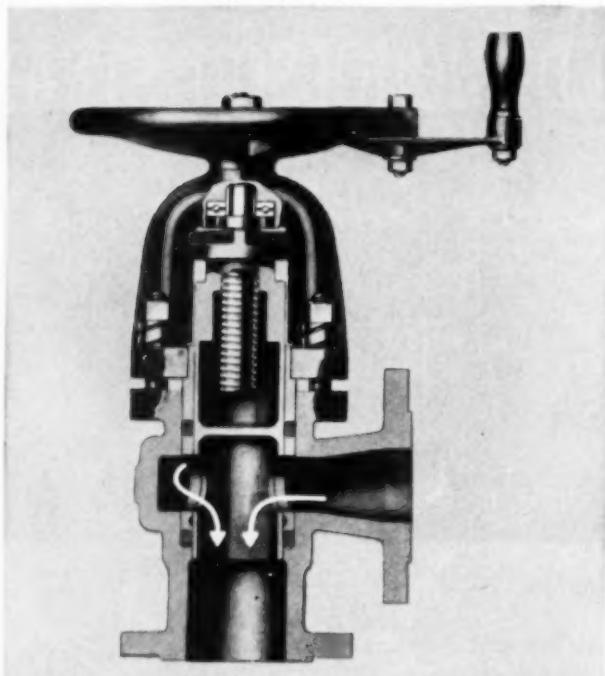
Types for every process, power and heat application.



These YARWAY VALVE DESIGNS

YARWAY SEATLESS

Features balanced nitr alloy hollow plunger that seals line drop-tight, yet permits free, unobstructed flow in blow-down. Other features —laminated packing, alemite lubrication, ball thrust bearings. USED SUCCESSFULLY IN OVER 15,000 BOILER PLANTS.



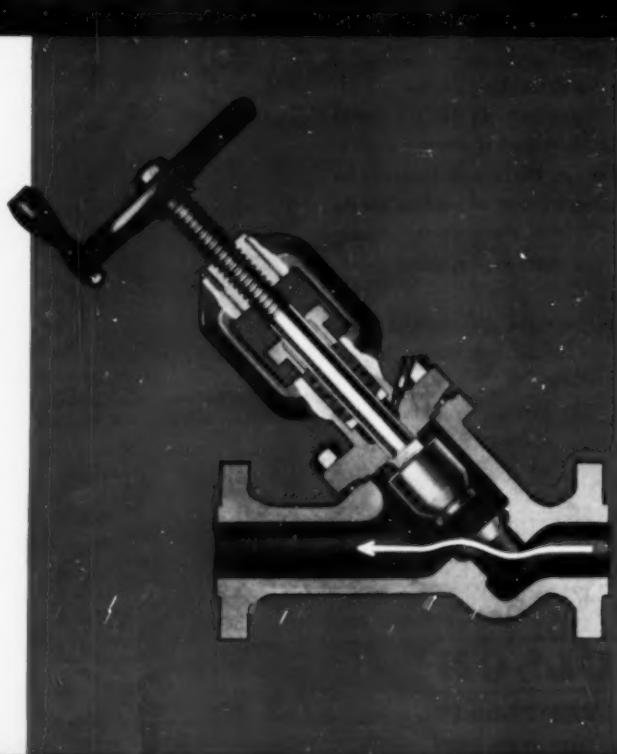
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FOR

HIGHER

PRESSES

USED IN OVER 15,000 BOILER PLANTS

serve *every* boiler blow-down need

■ Whatever your *pressure* requirement, whatever your *piping* requirement—there's a Yarway Blow-Off Valve to exactly meet your needs.

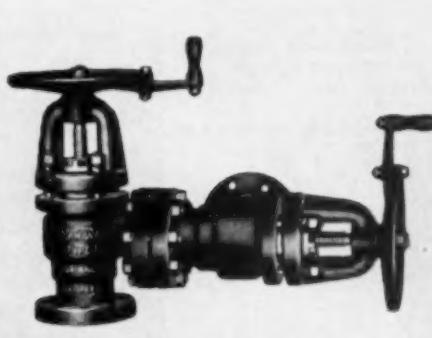
Popular Yarway *seamless* design keeps blow-down lines drop-tight in low and medium pressure ranges. Sturdy Yarway *stellite* seat and disc design protects higher pressures.

All Yarway Blow-Off Valves are strong, rugged valves, built to withstand the punishment of regular or emergency blowing-down under full boiler pressure, and are available in metals that stand up under acid washing of boilers.

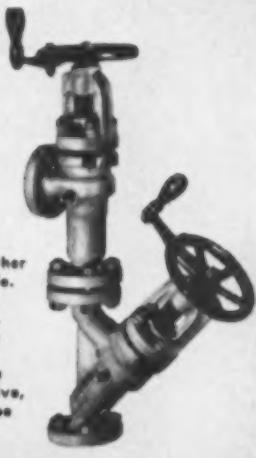
Write for new Yarway Blow-Off Valve Bulletins—B-426 (pressures to 400 psi) or B-434 (pressures to 2500 psi).



• Yarway Type B Seamless Blow-Off Valve, iron body for boiler pressures to 200 psi, steel bodies, for pressures to 400 psi. Angle valve shown, straightway available. Flanged connections. See Bulletin B-426.



• Yarway Type B Seamless Tandem Blow-Off Valve combining two angle valves. Other combinations available. Iron bodies for boiler pressures to 200 psi, steel bodies for pressures to 400 psi. See Bulletin B-426.



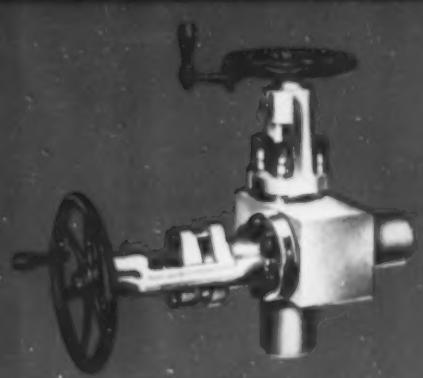
• Yarway Type C Seamless Tandem Blow-Off Valve combining angle and straightway valves. Other combinations available. Flanged or welding connections available. For boiler pressures to 600 psi. NOTE: When used in tandem with a Yarway Hard-Seal Valve, Type C Seamless may be used to 1500 psi. See Bulletin B-434.



• Yarway Hard-Seal Blow-Off Valve for pressures to 2500 psi. Straightway valve shown. Angle available. Welded (shown) or flanged connections. See Bulletin B-434.



• Yarway Hard-Seal—Seamless Bolted Tandem Blow-Off Valve. Hard-Seal is the blowing valve, seamless is the sealing valve. Available in any combination of connections. For pressures to 1500 psi. Hard-seal-hard seat tandem for pressures to 2500 psi. See Bulletin B-434.



• Yarway Unit Tandem Blow-Off Valve. Combines a hard-seat blowing valve and a sealing valve in one-piece forged steel body for boiler pressures to 1500 psi. For pressures to 2500 psi, two hard-seat valves are combined. See Bulletin B-434.

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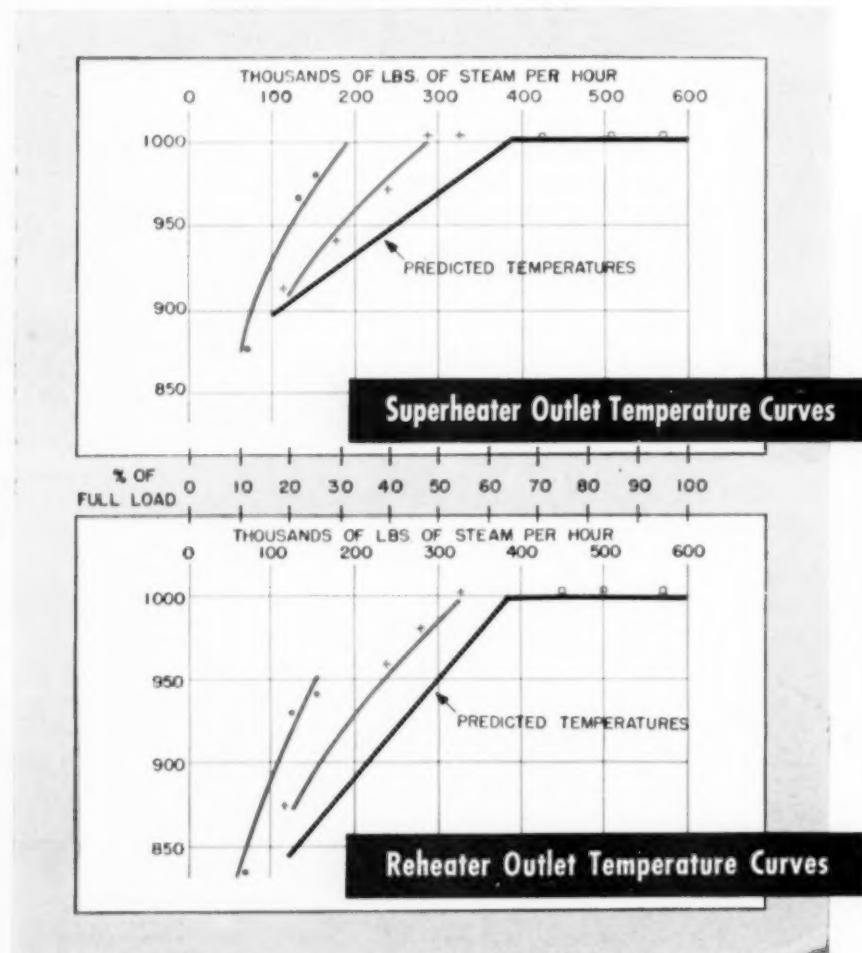
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- Temperature—9 Burners
- Predicted Temperatures

plus

Over-all performance better than guaranteed with
air heater exit temperatures and draft losses lower
than predicted.

A survey of your power plant by a consulting engineer will possibly
show ways of making surprisingly large savings in your power cost.

Utah Power and Light Company and Superheat Temperatures than 50% load!

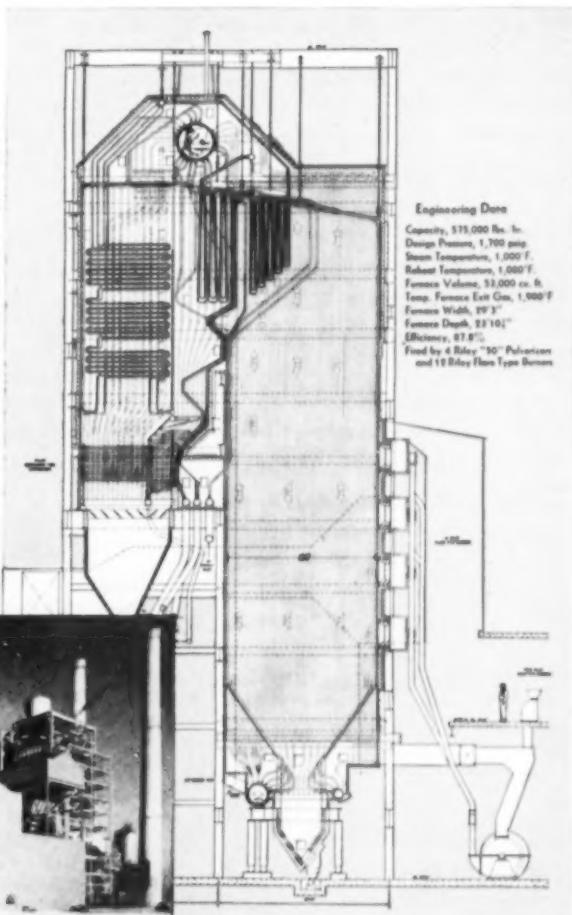
The modern Riley Reheat steam generating unit at the Gadsby Station, Utah Power and Light Company, has continued to give entirely satisfactory service without a single major alteration or adjustment since it went on the line in November 1952.

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In addition, over-all performance was better than guaranteed with air heater exit temperatures and draft losses lower than predicted. Here is another good example of the advantages to be gained from doing business with Riley. Time after time Riley units have produced performance bonuses such as this. You, too, can possibly realize large savings in power costs by installing Riley steam generating units.

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1,250,000 lbs. hr. 1005°F Reheat
Texas Electric Service Co.
1,250,000 lbs. hr. 1005°F Reheat
Public Service Co. of Indiana, Inc.
884,000 lbs. hr. 1005°F Reheat
Dept. of Water & Power
City of Los Angeles
1,200,000 lbs. hr. 1000°F Reheat
Louisiana Power & Light Company
1,000,000 lbs. hr. 1005°F Reheat



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426 BLOW-OFF VALVES—Bulletin B-426, 39 pages—A new catalog on blow-off valves for boiler pressures up to 400 lb wsg, giving full details on seamless blow-off valves and double tightening blow-off valves.—TARNALL-WARING COMPANY.

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491 CONTROL VALVES—Catalog 1800-B, Illustrated—Describes complete line of Domotor, solenoid-operated and handwheel single seat control valves for handling difficult fluids under extremes of temperature and pressure. Offers full, unrestricted flow, positive plug and seat alignment and directional flow flexibility.—THE ANNIN COMPANY.

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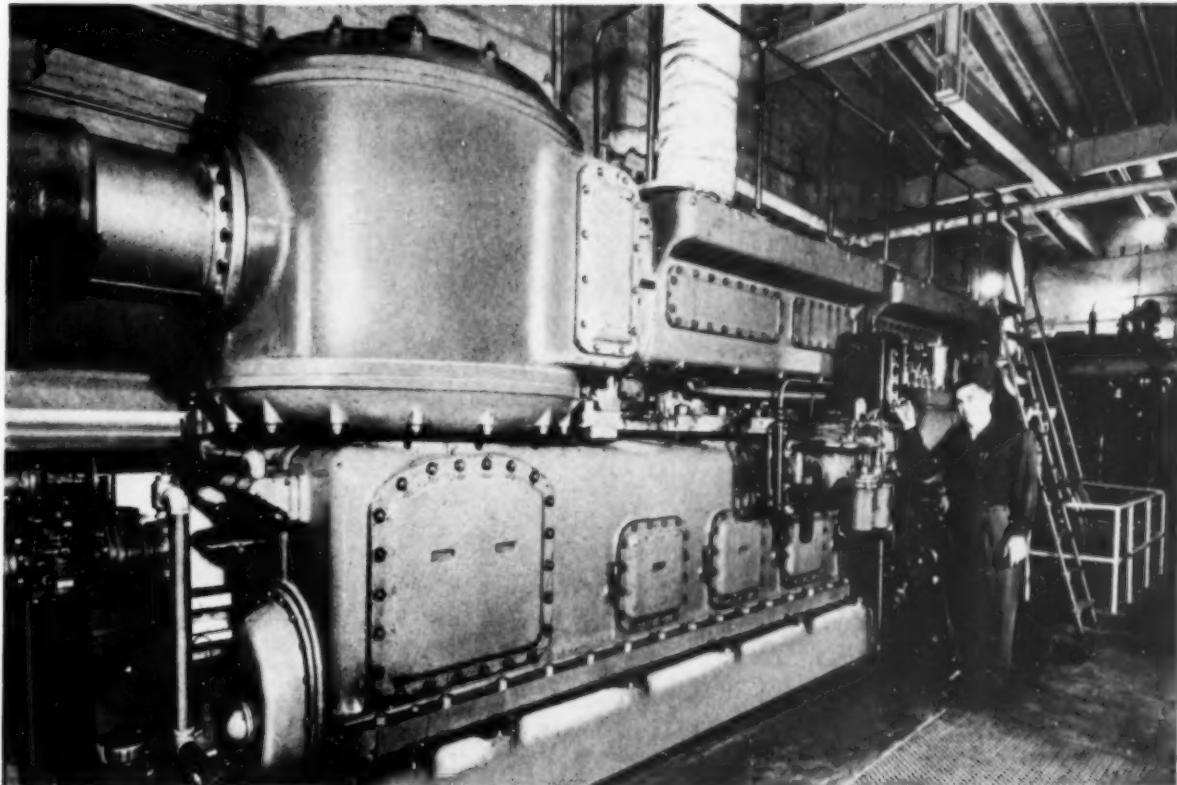
994 MULTICLONE MECHANICAL DUST COLLECTORS—Booklet M-204—Describes, with illustrations and diagrams, the basic principles of dust recovery by mechanical means at maximum efficiency.—WESTERN PRECIPITATION CORP.

Continued on page 122

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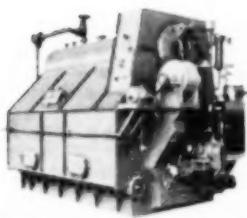
Early photograph of Wickes' shop force

The year was 1854. Franklin Pierce was President. Stephen A. Douglas was leading a fight to abolish the Missouri Compromise on slavery. The railroads were beginning their first westward expansion . . . just the year before, rail connection had been established between New York and Chicago. Only 10 years before, Samuel F. B. Morse had invented the telegraph, and new inventions were rapidly changing the face of American industry. Large scale production was at hand, and industry stood on the threshold of a new, remarkable era.

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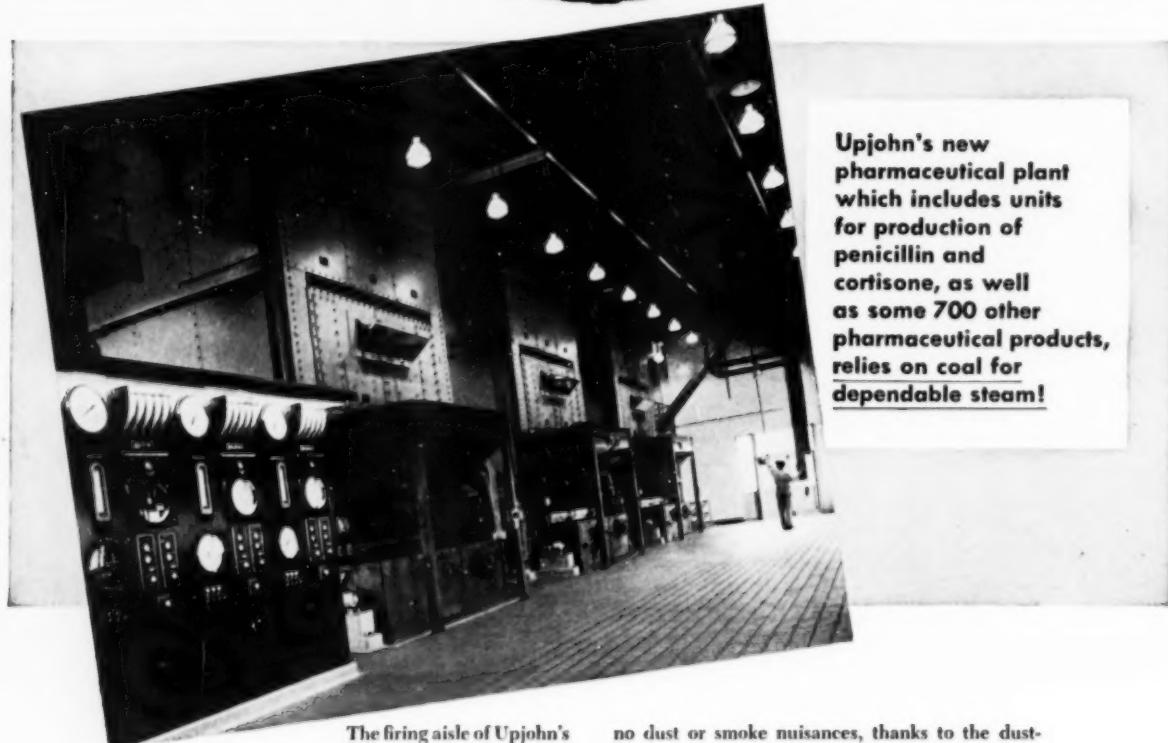
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RECOGNIZED QUALITY SINCE 1854

For **LOW-COST DEPENDABLE** steam, **UPJOHN** burns **COAL** the modern way!



The firing aisle of Upjohn's ultramodern steam plant.

This plant supplies steam, cleanly and efficiently, at only 40¢ to 42¢ per 1,000 lbs. for the Portage Road Plant near Kalamazoo, Michigan. There are

no dust or smoke nuisances, thanks to the dust-collecting and cinder re-injection system. Ash handling is fully automatic. These 3 boilers, plus a fourth recently installed (not illustrated), deliver up to 115,000 lbs. steam per hour at peak load.

Whether you're building a new plant or modernizing an older one, you can count on coal for dependability and low-cost operation.

Here's why: Up-to-date coal-burning equipment can give you 10% to 40% more steam per dollar. Automatic coal- and ash-handling systems can cut your labor cost to a minimum. Let a consulting engineer show you how a modern coal installation, tailored for your specific needs, can save you real money.

Here's something else, too—of all fuels, coal alone has virtually inexhaustible resources. This, plus the fact that America's highly mechanized coal industry is the most efficient in the world, assures you of a dependable supply of coal at relatively stable prices now and for years to come.

If you operate a steam plant, you can't afford to ignore these facts!

COAL in most places is today's lowest-cost fuel.

COAL resources in America are adequate for all needs—for hundreds of years to come.

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

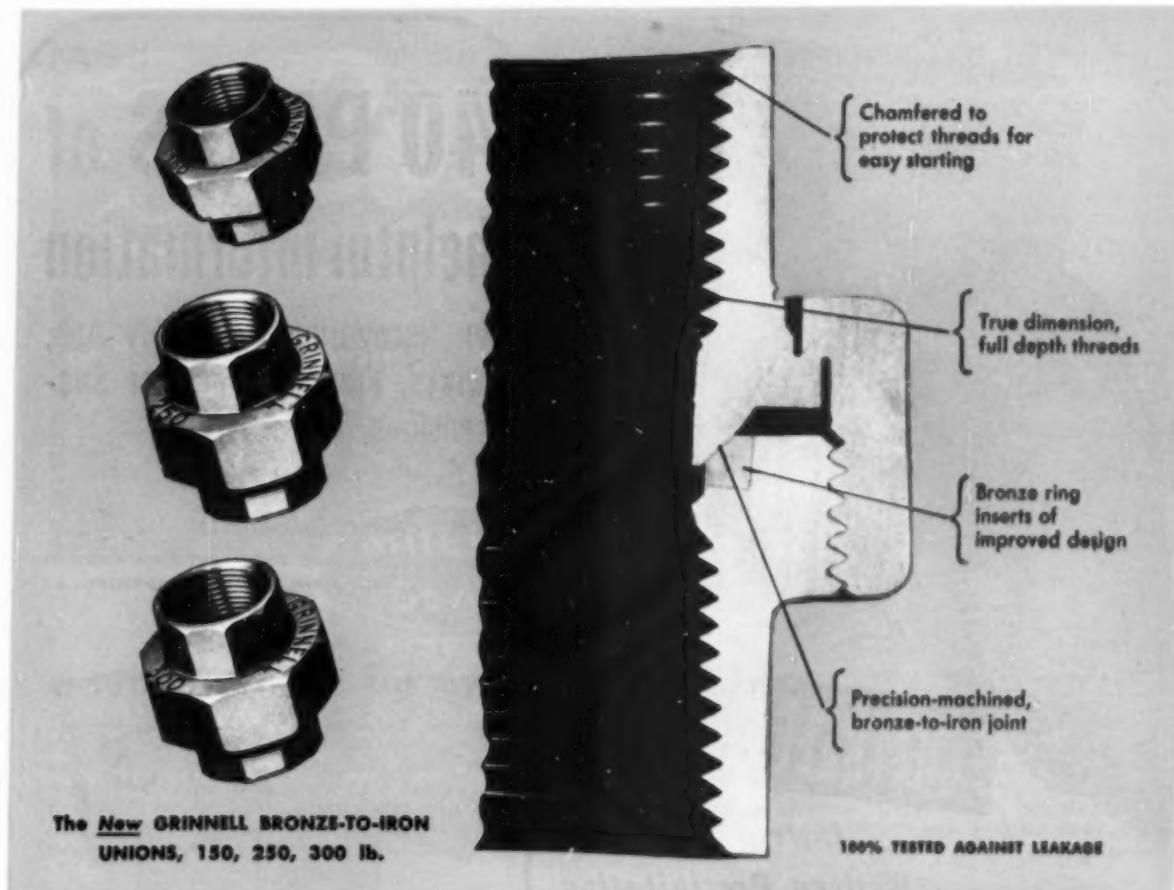
COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE

A Department of National Coal Association, Washington, D. C.

FOR HIGH EFFICIENCY  FOR LOW COST
YOU CAN COUNT ON COAL!



Here's the inside story behind the new GRINNELL UNIONS

Cut-away view of the new Grinnell bronze-to-iron union reproduced here is *exactly as photographed*. It has not been retouched in any way.

The "inside story", as told by the camera, points up the engineering achievement that makes the new Grinnell bronze-to-iron union a standard of comparison for the industry.

What the camera cannot show you is the Quality Control which

goes into the new Grinnell Unions. For instance: each union is tested against leakage by applying air pressure under liquid.

High quality materials, completely new, modern manufacturing machinery, and highly skilled personnel are employed in the manufacture of the new Grinnell unions. Branch warehouses and distributors, from coast to coast, make local stocks as convenient as your telephone.

Features of the new Grinnell bronze-to-iron unions:

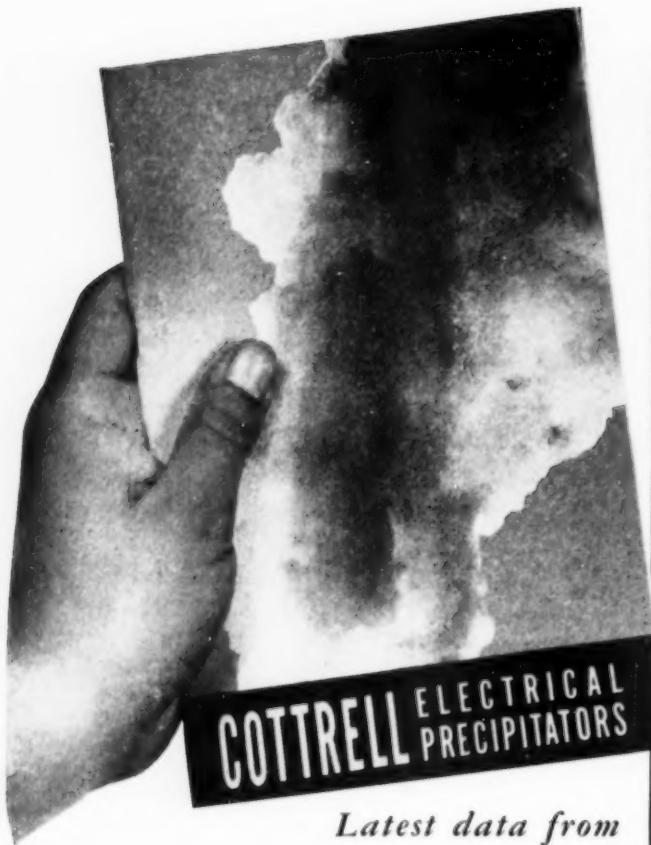
- Precision-machined, bronze-to-iron joint for a positive, leak-proof connection
- 100% tested with air under liquid
- Bronze ring inserts of improved design — bonded to iron by newly developed equipment
- True dimension, full depth threads
- Chamfered to protect threads for easy starting
- Designed for rugged service

GRINNELL
WHENEVER PIPING IS INVOLVED



Grinnell Company, Inc., Providence, Rhode Island

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports
Thermalier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems



*Latest data from
Western Precipitation
on Cottrell Recovery Equipment*

Do you have operations in your plant where gas-laden suspensions, wet or dry, are a problem? Such suspensions may be dropping on surrounding property, causing nuisance difficulties.

Or perhaps important values are being lost in stack gases that can be profitably recovered.

Whatever the nature of your recovery requirements, you will find this 40-page Cottrell booklet of great help. It contains up-to-date data on the latest advancements in the electrical precipitation field — prepared by the organization that pioneered the commercial application of Cottrell Electrical Precipitators almost a half century ago and has consistently led in new Cottrell developments.

A copy of this data-packed booklet will be sent free to engineers and other executives interested in recovery processes. Send your request to our nearest office.

For nearly 50 years Western Precipitation has carried on a continuous research and development program on Cottrell Electrical Precipitators, Multiclon Mechanical Collectors and other types of recovery equipment. We are not affiliated with any other company in the electrical precipitation field except our wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. We are equipped to serve you anywhere in the United States, Canada, and throughout the world!

40 PAGES of helpful information

on Recovering Dusts, Fly Ash, Mists, Fumes and other Suspensions from Gases.

This booklet summarizes the important points design and plant engineers should know about Cottrell Precipitators . . .



- Basic types of Cottrell equipment.
- Principal elements in a Cottrell unit.
- Data on Mechanical and Electronic Rectifiers.
- Various types of Collecting Electrodes (rod curtains, corrugated plates, pocket electrodes, etc.).
- Typical ways of removing collected material.
- Various Shell Constructions (steel, concrete, brick, etc.).
- The effect of various factors on efficiency and performance.
- Data on CMP (Combination Multiclon-Precipitator) Units.

. . . and many other helpful facts on Cottrell design and operation.

WESTERN
Precipitation
CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR
COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

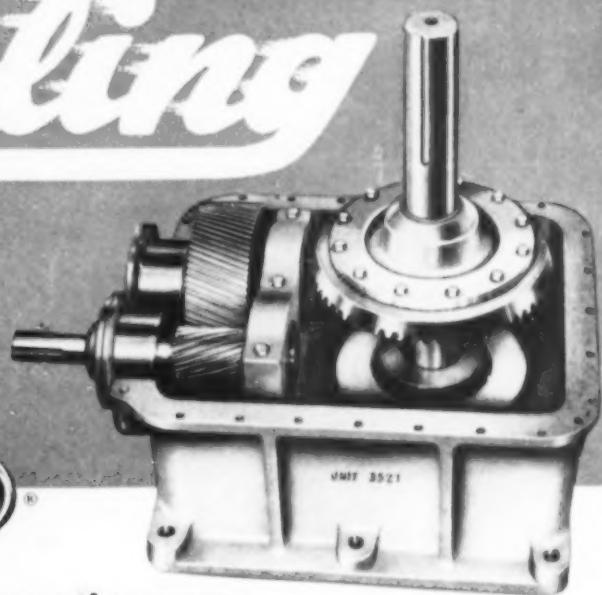
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3 Cooling

TOWER DRIVES

by

PHILLIE
GEAR



a type and size for every requirement

The growing use of larger fans in cooling tower service brought the need for a drive that would best meet heavier load conditions. Philadelphia, having long been a leading manufacturer of conventional worm gear cooling tower drives, thoroughly understood this problem and presents a complete line of right angle Speed Reducers . . . Worm Gear, Spiral Bevel, and Helical Spiral Bevel. All three types are specifically

manufactured for cooling tower fan drives. Housings are made of high quality close-grained grey iron and are proportioned to withstand the severe stresses encountered during operation. All shafts mounted in anti-friction bearings to assure high efficiency, correct center distance and proper shaft alignment. Bearings provide generous thrust and radial capacity . . . all these features give long, quiet service life.

worm gear

HP range—3 thru 30 HP @ 1750 rpm input.

Ratio range—3½ to 8½.

Efficiency—up to 95% depending on ratio.

Application—Best economy in range up to 25 HP. Quiet operation, suitable for input speeds up to 2000 rpm.



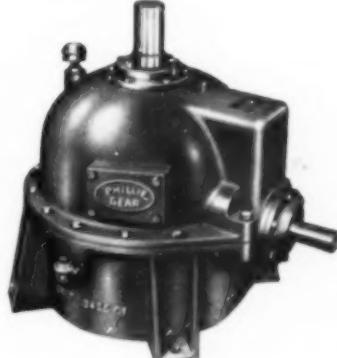
spiral bevel

HP range—15 thru 75 HP @ 1750 rpm input.

Ratio range—3½ to 9½:1.

Efficiency—97.98%.

Application—Best economy above 15 HP. Advantages of high efficiency, small heat loss. Suitable for input speeds up to 2500 rpm.



helical spiral bevel

HP range—20 thru 115 HP @ 1750 rpm input.

Ratio range—6½ to 15:1.

Efficiency—95.96%.

Application—Best economy when used on drives greater than 25 HP and when required ratios exceed those possible with single reduction spiral bevel. This unit also best suited for turbine applications up to 4000 rpm input.

PHILADELPHIA GEAR WORKS, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
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Write for our new catalog CT-53 illustrating all types of Cooling Tower gear drives and their applications.

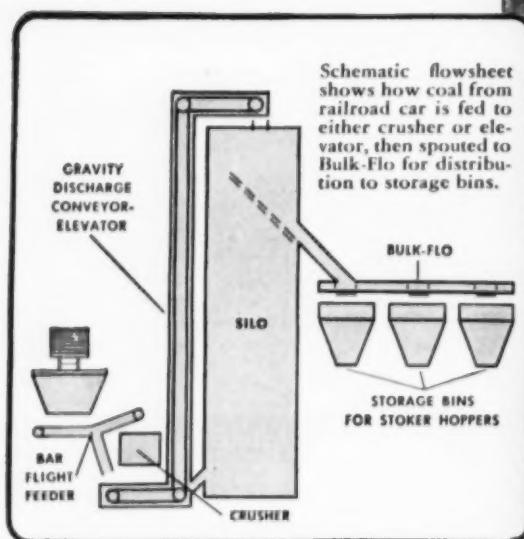


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Limitorque Valve Controls

FROM SIDING TO STOKER--

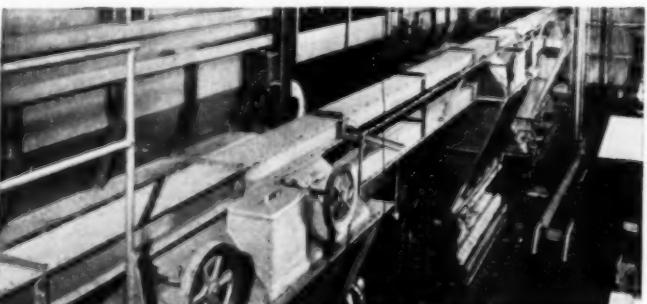
it's Link-Belt
for low-cost
coal handling



Up to 50 tons of coal per hour can be unloaded from railroad cars at this industrial power plant. Link-Belt gravity discharge conveyor-elevator is 70 ft. high.



Simple and effective, this Link-Belt bar flight feeder travels at 45 ft. per min., operates on 45-ft. centers.



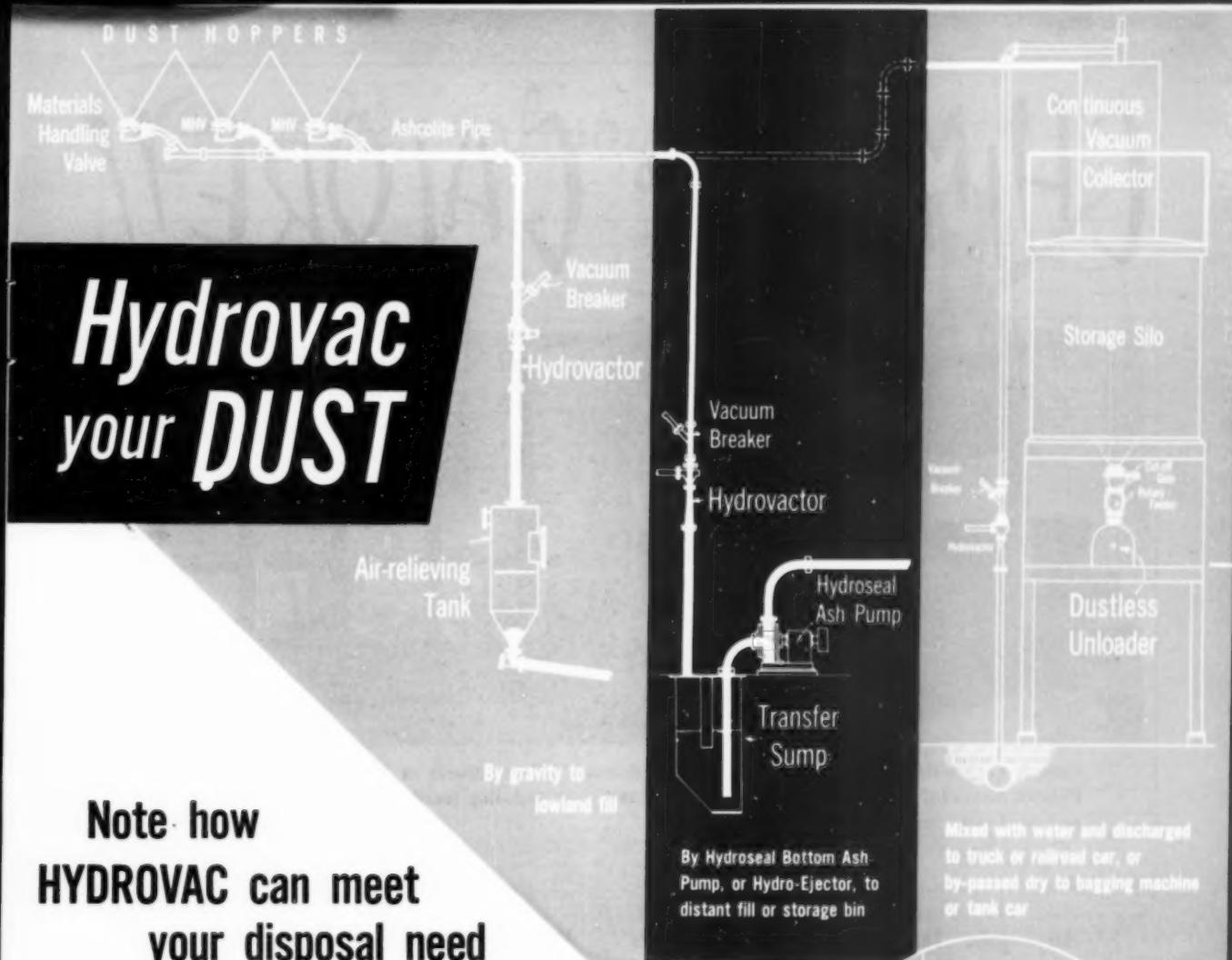
Dust-tight Link-Belt Bulk-Flo feeder-conveyor delivers coal to any of three stoker storage bins at 15 tons per hour.

LINK-BELT
COAL HANDLING EQUIPMENT



LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

13-405



Note how **HYDROVAC** can meet your disposal need

Every Hydrovac system provides the most efficient transportation of dust yet devised. Versatility of disposal makes Hydrovac adaptable to the conditions at your plant. Its long-range economy is another reason for your changing over to Hydrovac — and lasting satisfaction.

*For detailed information,
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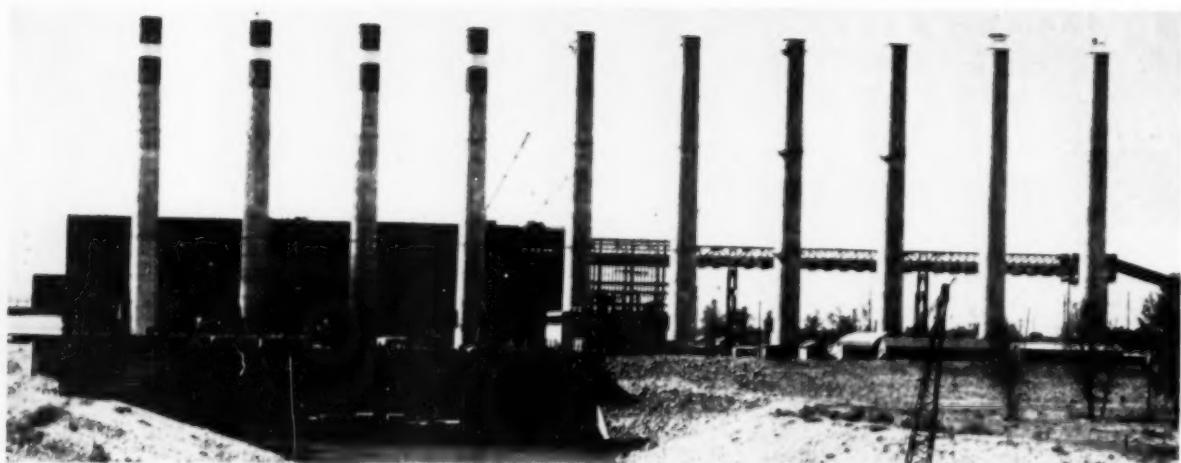
HYDROJET



materials handling systems

HYDROVAC

CHIMNEYS GALORE!!



Custodis Construction Company, Inc., built for the Tennessee Valley Authority at the Shawnee Steam Plant near Paducah, Kentucky, ten reinforced concrete chimneys 299' x 14' including foundations with independent linings of perforated radial brick.

Any job, large or small, receives the careful attention and benefit of Custodis' long experience, sound engineering, expert supervision and skillful workmanship. Custodis excels in this work—a sparkling example is TVA's Shawnee Steam Plant pictured above—and you profit from their more than 50 years of stack experience.

Whether your chimney is of brick, steel or concrete, a systematic maintenance plan can be money in the bank for you. Turn to the expert engineers and inspectors of Custodis, skilled in all phases of this highly specialized work. If the chimneys in your plant are cracked or corroded, stop this operating liability with a call to Custodis.

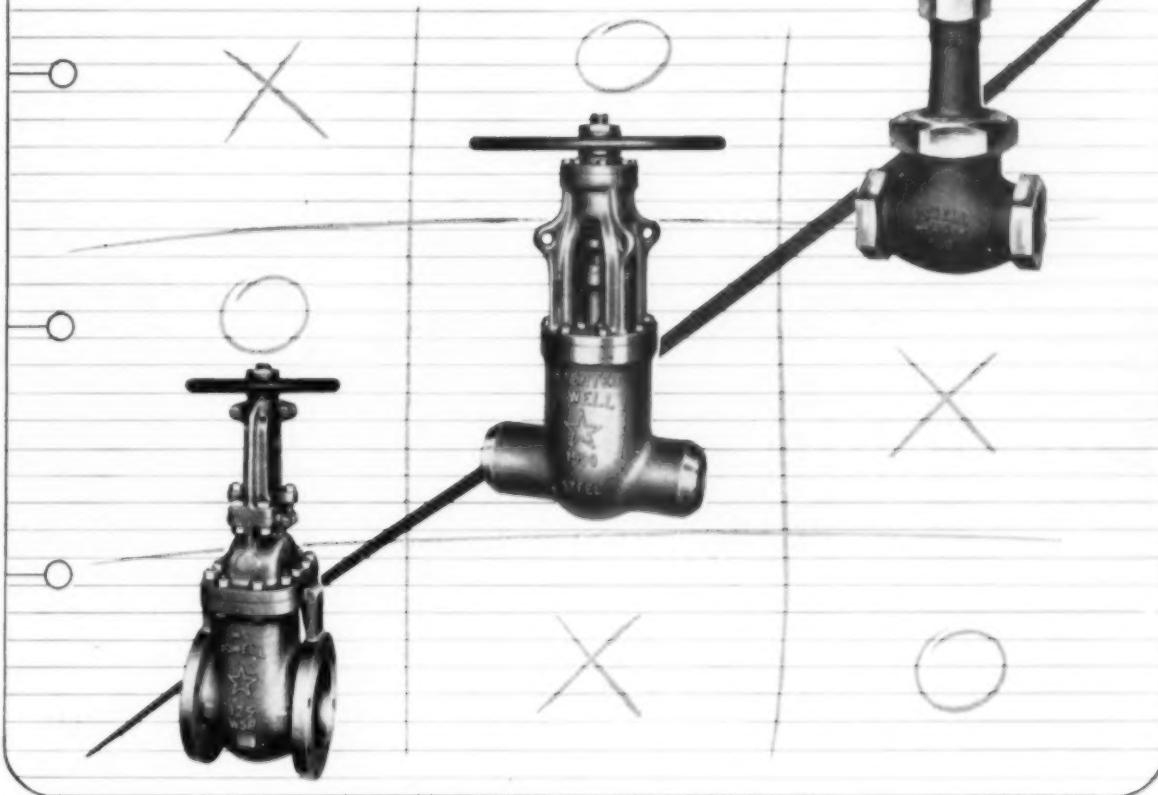
CUSTODIS CONSTRUCTION COMPANY, INC.

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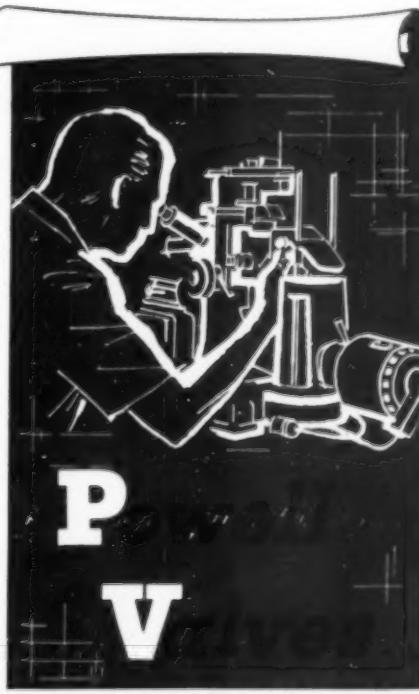
One line always wins



TOP
BRONZE "W.S." FULL FLOW GLOBE VALVE (Fig. 2608) for 200 pounds W.P. Regrindable, renewable, hardened stainless steel seat and disc. Nominal pipe size opening through seat permits fuller flow, with pressure drop and turbulence cut to minimum.

CENTER
PRESSURE SEAL CAST STEEL GATE VALVE (Fig. 11303). 1500 pounds. Many proven advantages and exclusive features. Pressure Seal Valves are also available in Non-Return, Check, Globe and Angle Patterns for 600, 900, 1500, 2500 pounds.

BOTTOM
"MODEL STAR" GATE VALVE (Fig. 1793) for 125 pounds W.P. Iron body, bronze mounted. Supplied with taper solid wedge. Sizes 2" to 30", inclusive.



There's never any doubt about what tack to take in choosing the winning line of valves. It's Powell! For Powell Valves are manufactured up to The William Powell Company standards of quality—standards that have kept rising for more than a century.

What's more, Powell has a *complete line*—probably manufacturing more types of valves than any other organization in the world.

Powell Valves are available through distributors in principal cities. If a distributor is not located near you, just write us. We'll be pleased to tell you about our complete line and answer your questions. Answering questions is a specialty at Powell where solving valve problems has built the world's most valuable background of sound solutions.

CONTROLS FOR THE LIFE LINES OF INDUSTRY

..... 108th YEAR

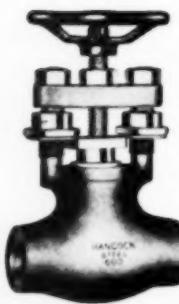
THE WM. POWELL COMPANY • CINCINNATI 22, OHIO



150#, 200# and 300#
Bronze Globe, Angle and
Check Valves



800# Steel Gate Weldvalves



600# Steel Globe and Angle
Weldvalves



1500# and 2500# Steel
Globe and Angle Weldvalves

There's a
HANCOCK VALVE
FOR YOUR TOUGHEST
SERVICE REQUIREMENTS

Illustrated are some of the many fine Hancock Valves that contribute substantially to the high efficiency of plant operation and the low cost of valve maintenance. By anticipating the changing needs of expanding industry, Hancock has—since 1877—pioneered the development of many different types of valves. Today, the outstanding quality and superior performance of Hancock Valves continue to surpass practically every job requirement, regardless of the demands of service. Yet, despite their long, trouble-free life, Hancock Valves cost no more than ordinary valves.

**When Hancock's go in,
valve costs go down**



600# through 1500#
Hi-Pressure Drop Weldvalves

150# and 300# Bronze and
600# Steel 'Flocontrol'
Valves



300#, 600#, 1500# and
2500# Boiler Blow-Off Valves



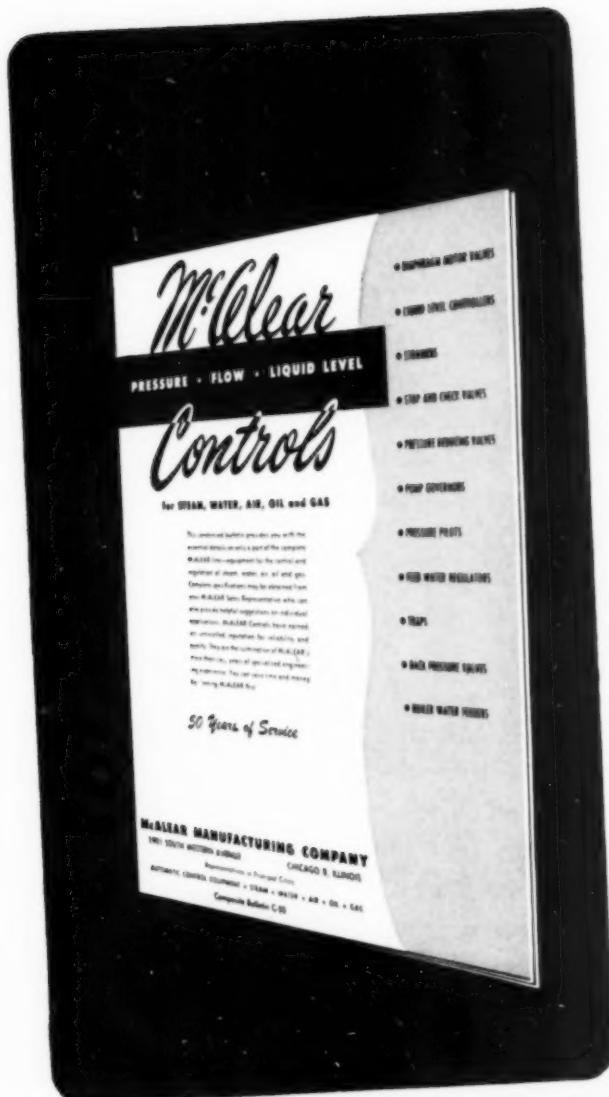
300# and 600# Cast Steel
Globe, Angle and Check Valves



HANCOCK VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** Watertown 72, Massachusetts

MAKERS OF 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES,
'AMERICAN' INDUSTRIAL INSTRUMENTS, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND
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WHEN you select your pressure reducing and desuperheating station, you'll pay more if you buy COPES. But if your job is a tough one, you'll find COPES cheapest in the long run. You'll be money ahead in installation, operation and maintenance costs, and you'll be getting accurate control—even down to your lightest loads, not just at your normal flows.

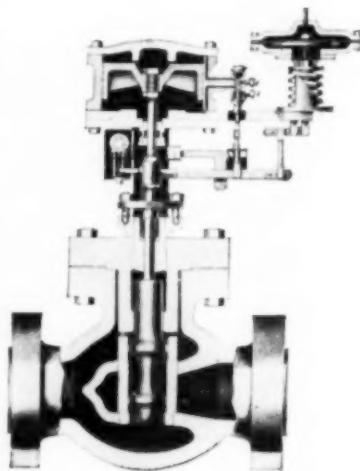
You'll get *quiet* operation—avoiding annoying chatter and destructive vibration.

You'll get 'round-the-clock dependability for years to come—with any adjustments or maintenance easily handled by your plant personnel.

It all adds up to the kind of performance you need for your tough jobs—results you cannot expect if you buy on price.

COPES-VULCAN DIVISION

CONTINENTAL FOUNDRY & MACHINE COMPANY
ERIE, PENNSYLVANIA



The COPES DESUPERHEATER

You'll find it easy to install the self-contained COPES Desuperheater. It goes into the line as a unit, with only three connections. All accessories are furnished. You need no extra steam atomizing valve with extra stop valves—no long run of alloy-steel steam piping—no extra piping from the temperature element to the spray nozzle—no other extras.

You'll also find your COPES Desuperheater correctly sized for low velocities—for minimum noise, vibration and wear. You'll find temperature control accurate—even on lightest flows—because cooling water is controlled and completely atomized inside the mixing chamber. Adjustment is simple and permanent.

The COPES REDUCING VALVE

You'll find your COPES valve ports accurately designed for the correct capacities under the flow and pressure conditions you specify. You'll have no "hunting" to upset the precision of your control.

You'll find extra-heavy construction throughout. The valve piston is supported and guided in the areas subject to greatest velocities and forces. If these forces could cause excessive erosion, Stellite is welded to all contact surfaces before they are precision-ground to correct clearance for your installation. You'll find design and construction minimizes the possibility of sticking, leaking or vibrating. You'll suffer no objectionable noise.

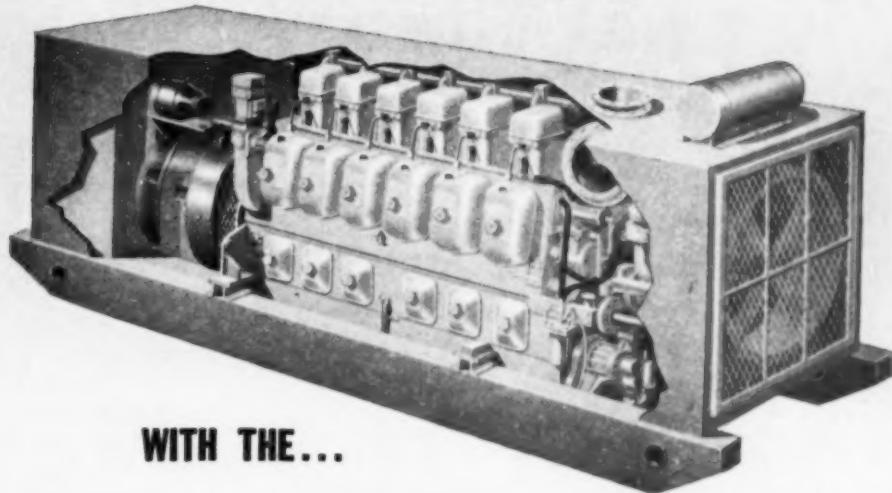
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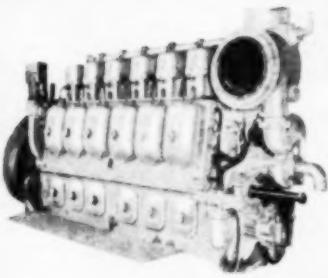
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WHERE YOU WANT IT, WHEN YOU WANT IT



WITH THE...

NEW, PORTABLE ALCO DIESEL ELECTRIC GENERATOR UNIT



Alco 6-cylinder 9" x 10 $\frac{1}{2}$ " (251-A), 4-cycle, turbocharged diesel engine, dry weight 21,350 lbs. Twelve- and 16-cylinder engines also available.

Here's the answer to your demand for a compact, economical power generating unit for emergency, temporary or standby service.

A completely self-sufficient power plant, the new, portable Alco Diesel Electric Generator unit consists of a 9" x 10 $\frac{1}{2}$ ", 4-cycle turbocharged Alco diesel engine, in sizes ranging from 390 to 1300 kw, with all necessary auxiliary equipment.

It can be rail-mounted for electric power *where you want it, when you want it*. It can be installed

for

- ★ Emergency power generation
- ★ Power during construction or repair
- ★ Supplemental power during peak periods
- ★ Hospital or civil defense standby service
- ★ Scores of other municipal and industrial uses

permanently for applications such as standby service in hospitals and municipal power plants.

Either way, it puts dependable power at your immediate call twenty-four hours a day.

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P. O. Box 1065
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Please send me complete information about the new Alco Portable Diesel Electric Generator Unit.

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Company _____

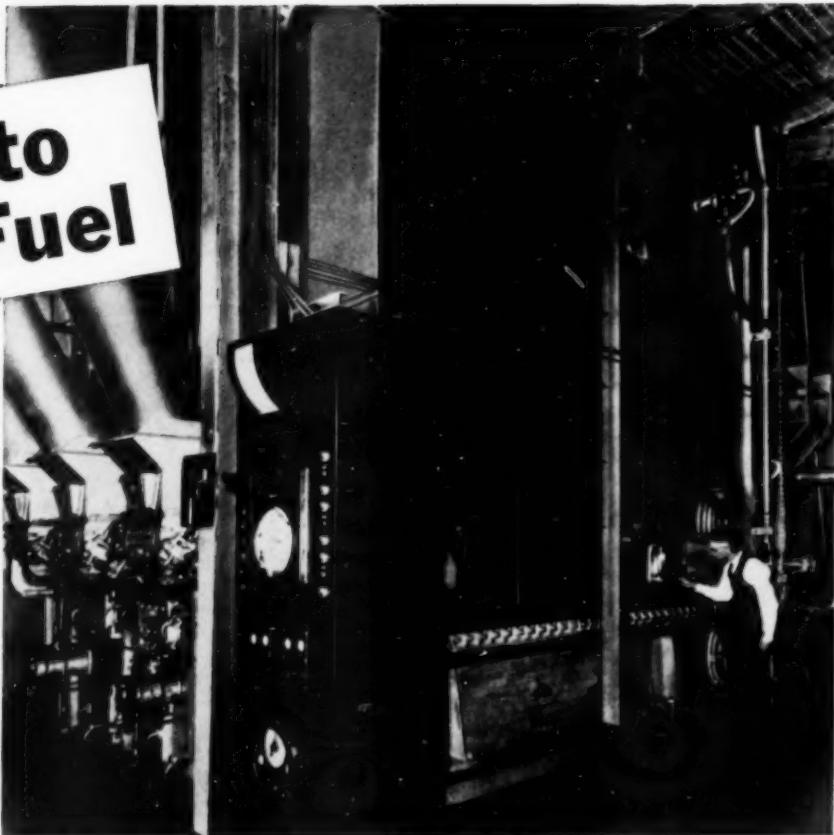
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ALCO DIESELS
AMERICAN LOCOMOTIVE COMPANY
SCHENECTADY, N. Y.

How to Save Fuel

Fuel savings of 15% have resulted from steam plant modernization at General Mills, Inc., Buffalo, N. Y. The program included this installation of Bailey Meter Control on a 45,000 lb per hr, 170 psi spreader stoker-fired boiler.



• The heat energy you get from a unit of fuel depends on the performance of your steam plant equipment. And that's where Bailey controls can help. With a Bailey-engineered control system you can count on a higher output of available energy per unit of fuel. Here's why:

1. Suitable Equipment

When you receive equipment recommendations from a Bailey Engineer his selections come from a complete line of well-engineered and carefully tested products.

2. Seasoned Engineering Experience

Your local Bailey Engineer brings you seasoned en-

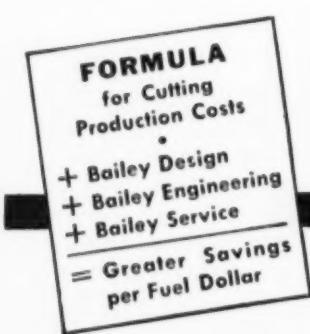
gineering experience based on thousands of successful installations involving problems in measurement, combustion, and automatic control.

3. Direct Sales-Service—close to you

For your convenience and to save time and travel expense there's a Bailey District Office or Resident Engineer in or close to your industrial community.

For greater fuel savings, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're glad to stand on our record.

A-121-1



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Complete Controls for Process Plants

Controls for
TEMPERATURE
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"AUTOMATIC CONTROLS CUT OUR COAL BILL 20%!"

"We gave our modern coal-heating installation an additional boost in efficiency with automatic controls . . . saved \$600 the first season,"

**says R. C. Smith, Manager
Northern Finance Company, Northern Building
Green Bay, Wisconsin**



Located in the heart of the city, Northern Finance Company's coal-heated building meets strict smoke control regulations. Burned properly, coal is clean and convenient.

How modern coal equipment can save you dollars

If your plant is more than a few years old, you can probably boost its efficiency and save money with modern combustion equipment. For example, a small investment in automatic combustion controls, or an efficient forced draft system, may bring you big savings in both fuel and labor.

And if your plant is over 10 years old, chances are you can make an even bigger saving. You can save up to 40% on fuel alone by installing modern combustion equipment. You can reduce labor costs substantially with modern coal- and ash-handling equipment.

Call in a consulting engineer. He can give you advice on just what equipment can best fill your specific needs . . . and return you big savings year after year with coal.

BITUMINOUS COAL INSTITUTE

A Department of National Coal Association
Southern Building, Washington 5, D. C.

"Up-to-date coal equipment has long supplied our building with dependable, economical heat. But a small additional investment in new automatic draft and building zone controls brought us even bigger savings. We cut fuel costs \$550 to \$600 a year."

Additional case histories, showing how other types of plants have saved money by burning bituminous coal with modern equipment, are available upon request.



The stoker-fed boilers and newly installed control panel used in heating this modern office building. Approximately 285 tons of coal are used annually.

If you operate a steam plant, you can't afford to ignore these facts!

BITUMINOUS COAL in most places is today's lowest-cost fuel, and coal reserves in America are adequate for hundreds of years to come.

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

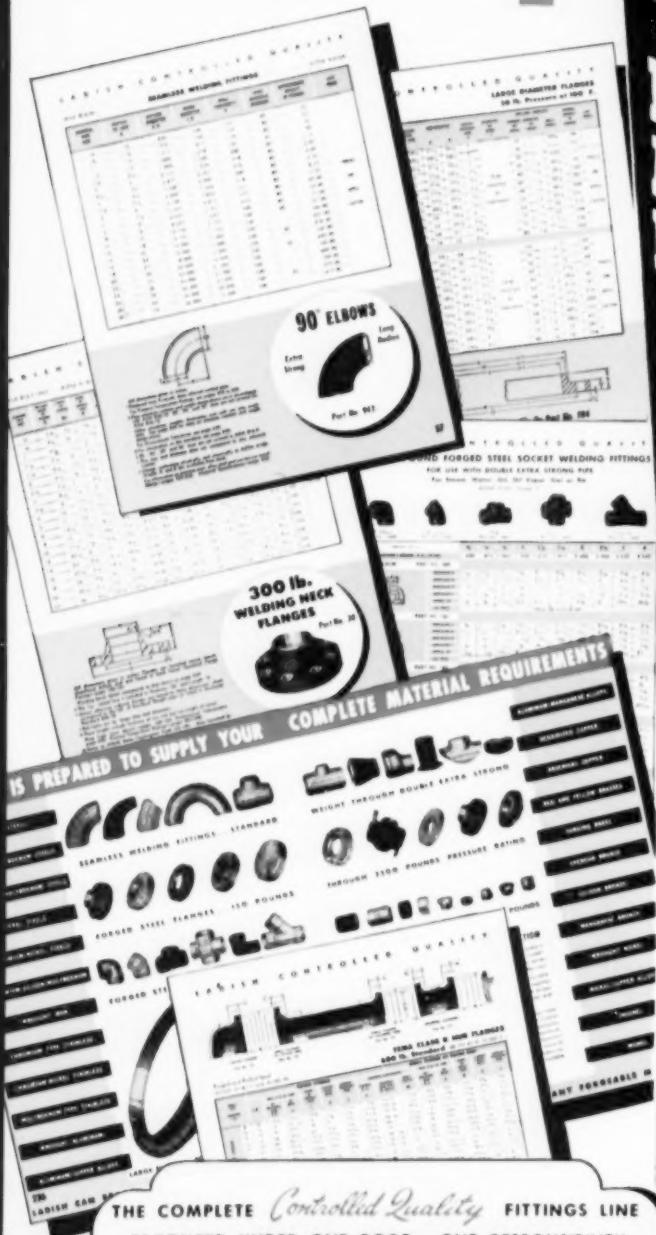
COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

**FOR HIGH EFFICIENCY FOR LOW COST
YOU CAN COUNT ON COAL!**

SEND FOR YOUR NEW
304-PAGE LADISH
 FITTINGS CATALOG NOW



THE COMPLETE *Controlled Quality* FITTINGS LINE
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**209 PAGES OF
 SPECIFICATIONS AND ORDERING
 INFORMATION ON *Controlled Quality* FITTINGS**

Here are detailed dimensions, weights and specifications to assist in selecting proper fittings for any application. Featured are a number of Ladish developments which improve piping efficiency. Major product listings by sections include:

68 PAGES BUTT WELDING FITTINGS

Available in Standard through Double Extra Strong weights...in sizes $\frac{1}{2}$ through 42 inches.

56 PAGES FORGED STEEL A.S.A. FLANGES

Available in 150 through 2500-pound pressure ratings...in sizes $\frac{1}{2}$ through 24 inches.

20 PAGES LARGE O.D. AND T.E.M.A. FLANGES

Available in a complete range of types and pressure ratings...in sizes up to 160 inches in diameter.

7 PAGES LONG WELDING NECK FLANGES

Available in 150 through 2500-pound pressure ratings...in sizes from 1 through 24 inches.

5 PAGES FORGED WELDLESS ROLLED RINGS

Available in diameters up to 240 inches in a wide variety of forged contours...in weights up to 40,000 pounds.

20 PAGES FORGED STEEL FITTINGS

Screwed and Socket-Welding types in 2000 through 6000-pound pressures, sizes $\frac{1}{8}$ through 4 inches.

12 PAGES STAINLESS AND ALLOY FITTINGS

Featuring data on properties of materials and a comprehensive table of piping specifications.

Controlled Quality

New LADISH Catalog

Provides detailed specifications on complete fittings line plus useful technical data to help solve piping problems

New from cover to cover and thoroughly up to date in latest provisions of codes and standards—this catalog presents a line broad and completely integrated in types, sizes, ratings and materials.

Easy to use... for it is fully tabbed with each section having its own pictorial index and table of contents. Durably bound, this book is a reference work on forged and seamless welding pipe fittings and flanges.

56 PAGES OF TECHNICAL DATA WITH LATEST CODE PROVISIONS SIMPLIFY DESIGN PROBLEMS

For busy engineers here are tabulations of pre-calculated values derived from frequently used design formulae which can be applied directly to the solution of piping problems with a minimum of computations. In addition to data on dimensional tolerances, friction loss and material specifications, this section contains valuable tables on:

ALLOWABLE STRESS AND P/S VALUES

Presented here in an easy to use form, these values help solve problems of wall thickness and working pressures in gas, power, district heating, refrigeration, oil transmission and refinery piping.

MAXIMUM WORKING PRESSURES

Tabulations for $\frac{1}{2}$ through 30-inch pipe in a wide selection of wall thicknesses and materials for operating temperatures from 100° F. through 1500° F., in power, district heating, oil transmission, refinery and gas piping systems.

FLANGE PRESSURE-TEMPERATURE RATINGS

Tabulations feature new ratings for a wide range of materials for temperatures from 100° F. through 1500° F.

PROPERTIES OF PIPE

Dimensional characteristics of carbon, alloy and stainless steel pipe in commonly used nominal sizes and wall thicknesses to help solve problems of anchorage, heat loss and insulation.

FLOW THROUGH ORIFICES AND NOZZLES

Discharge through orifices, nozzles and short tubes are tabulated for a wide range of pressures up to 5000 P.S.I. and diameters from $\frac{1}{64}$ through $1\frac{1}{4}$ inches.



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Please send me, without cost or obligation, the new 304-page LADISH Fittings Catalog No. 55.

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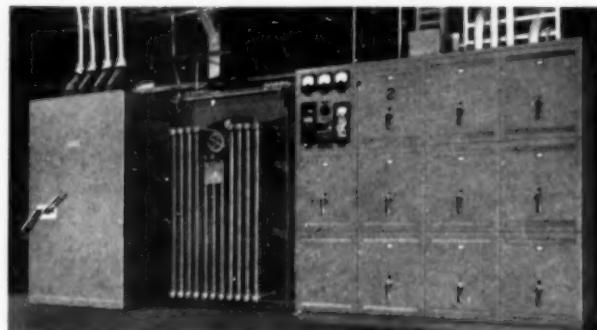
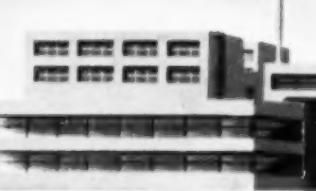
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...the choice of leaders
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Meet changing load demands with **Wagner Dry-Type Transformers**

Wagner dry-type transformers can solve your problems by putting the right voltage close to the load wherever machines, portable tools or lights require voltage changes.

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Wagner dry-type transformers meet all requirements for indoor installation. They will save you money on insurance premiums. Fireproof vaults or other special protection are unnecessary—even where fire hazards are present.

ECONOMICAL -

when you use Wagner dry-type transformers, you reduce installation costs—you reduce line losses—you eliminate long runs of secondary copper—and you can forget about maintenance.

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Wagner dry-type transformers are small in size—light in weight—easy to install and easy to move whenever changes in plant facilities make it necessary.

Wagner dry-type transformers for textile plants are totally-enclosed for protection against high humidity and are non-ventilated so that lint cannot clog the openings and cause over heating. These 55° rise transformers are available in single-phase units, 600 volts and below, in sizes 1 through 25 kva. Bulletin TU-201 gives full information.

Unit Substation Transformers for load-center power distribution

Wagner three-phase dry-type load-center transformers are built in ratings through 2000 kva in the 15-kv class and below. Transformer and incoming line section are housed in compact factory-matched enclosures, designed for direct connection to matching secondary switchgear to form a closely coupled unit substation that is streamlined in appearance and readily accessible. Complete enclosure of all equipment assures safety against contact with live parts.

Bulletins TU-56 and TU-13 give full information on Wagner Dry-Type and Liquid-Filled Substation Transformers. Write for your copies.

Wagner
Electric Corporation
EST. 1891

T54-1

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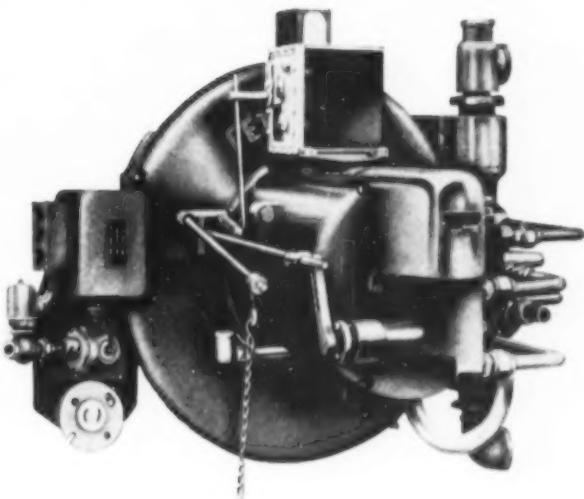
**Petro follows fluctuating load demands
with speed and reliability . . .**

No matter how the steam demand fluctuates, Petro's modulated firing quickly and automatically meets the need. Never underfires or overfires . . . and throttles down to a steady low-burning rate. But savings don't stop here. Petro industrial oil burners also are designed to use low-cost, heavy fuel oils with complete reliability. These heavy oils (Nos. 5 and 6) actually average 8% richer in heat value, yet cost less per gallon.

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**Residential Oil and Gas Burners,
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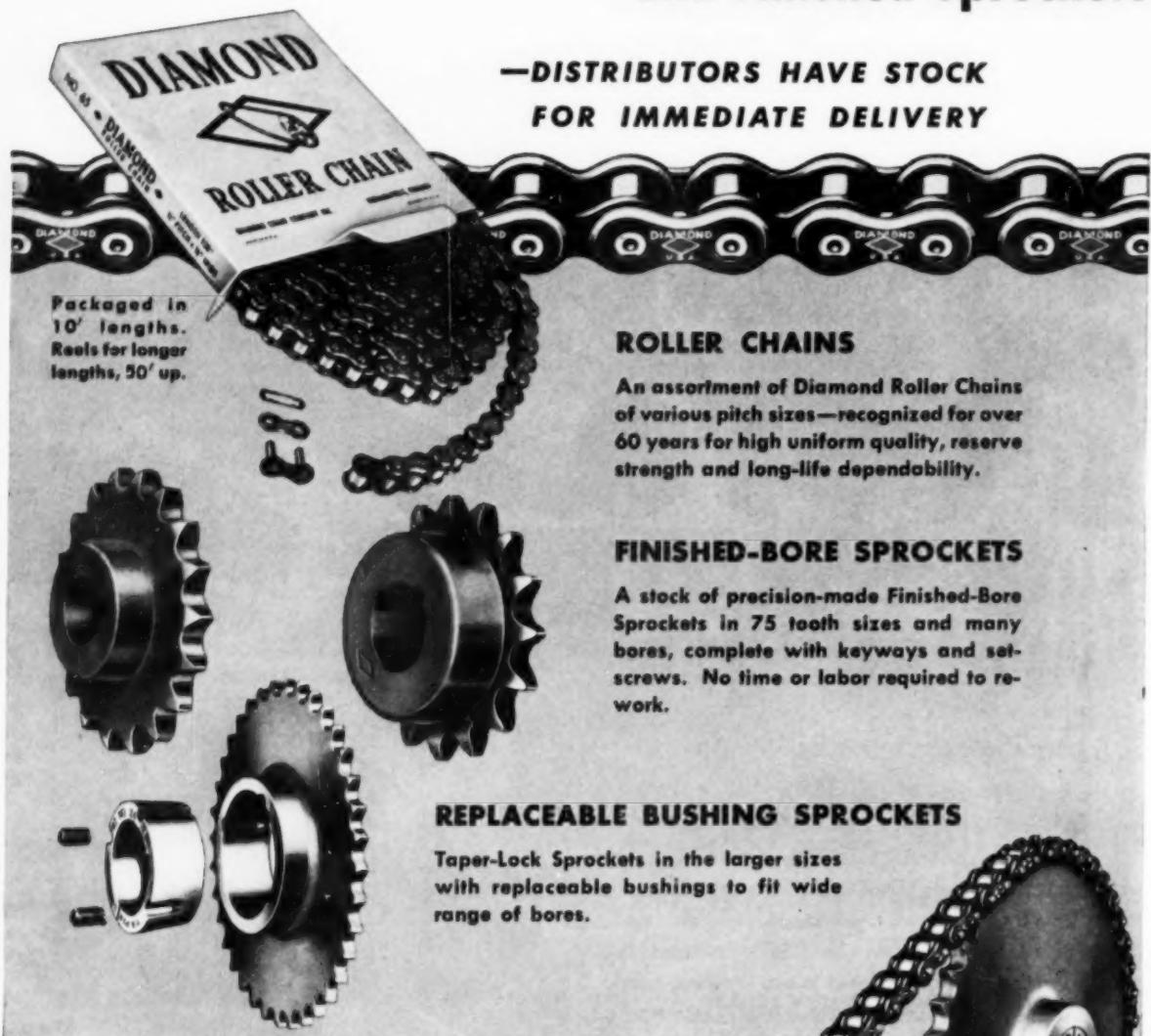
Rotary type. Burns low-cost heavy fuel oil with complete reliability. Capacities up to 200 gallons per hour. Combination oil-gas models also available, and complete forced draft packaged units.

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Taper-Lock Sprockets in the larger sizes with replaceable bushings to fit wide range of bores.

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See the classified section of your local telephone directory for the number and address of your nearest Diamond Roller Chain distributor.

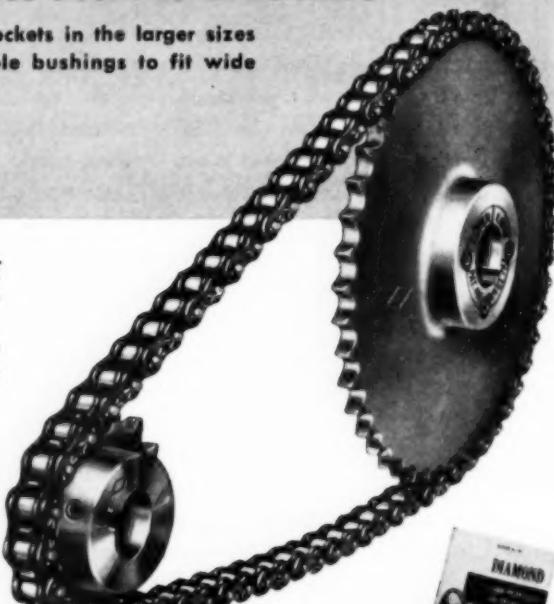
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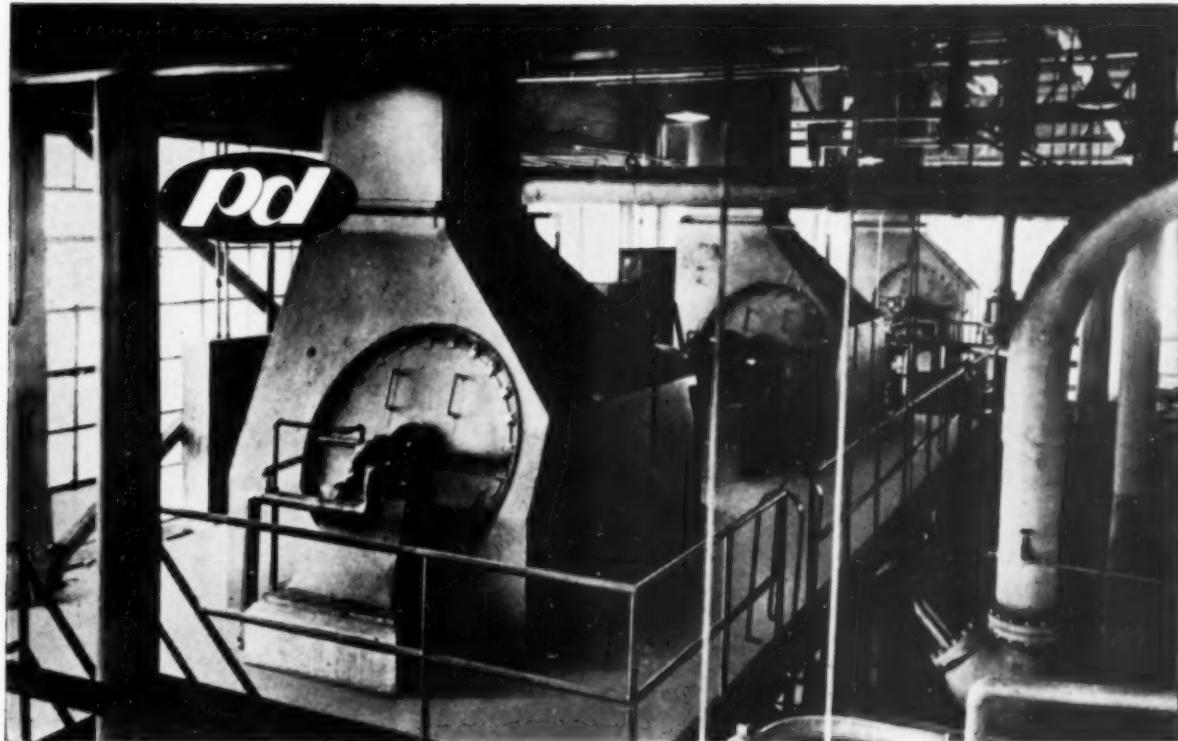
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P-D Dust Collectors and Fan Stacks Provide Maximum Flexibility and Unit Efficiency at Western Electric

**sturdy, self-supported units...
clean cut layout arrangements**

It takes steam—lots of steam—to keep Western Electric's big Indianapolis plant turning out millions of telephones each year. During processing, sizable quantities of steam are needed and in addition over a million square feet of factory and office space must be heated.

The system that solves this problem is designed to deliver 187,000 lbs. per hour of steam, from three 60,000 lb. per hour steam generators and a 7,000 lb. per hour, incinerator boiler. The four units are equipped with an integrated arrangement of Prat-Daniel Dust Collectors, Induce Draft Fans, Breechings and Stacks. Small diameter tubes

in the P-D Collector develop a high centrifugal force, providing maximum operating efficiency even at widely varying loads. The straight P-D Fan Stacks are of sturdy self-supporting construction. Flow through arrangement reduces resistance, providing more efficient draft production.

Engineered by Allen and Kelly of Indianapolis in collaboration with Western Electric's engineers,

Ask for the new P-D Catalog 4P201.

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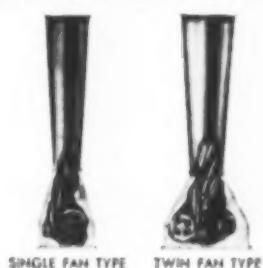
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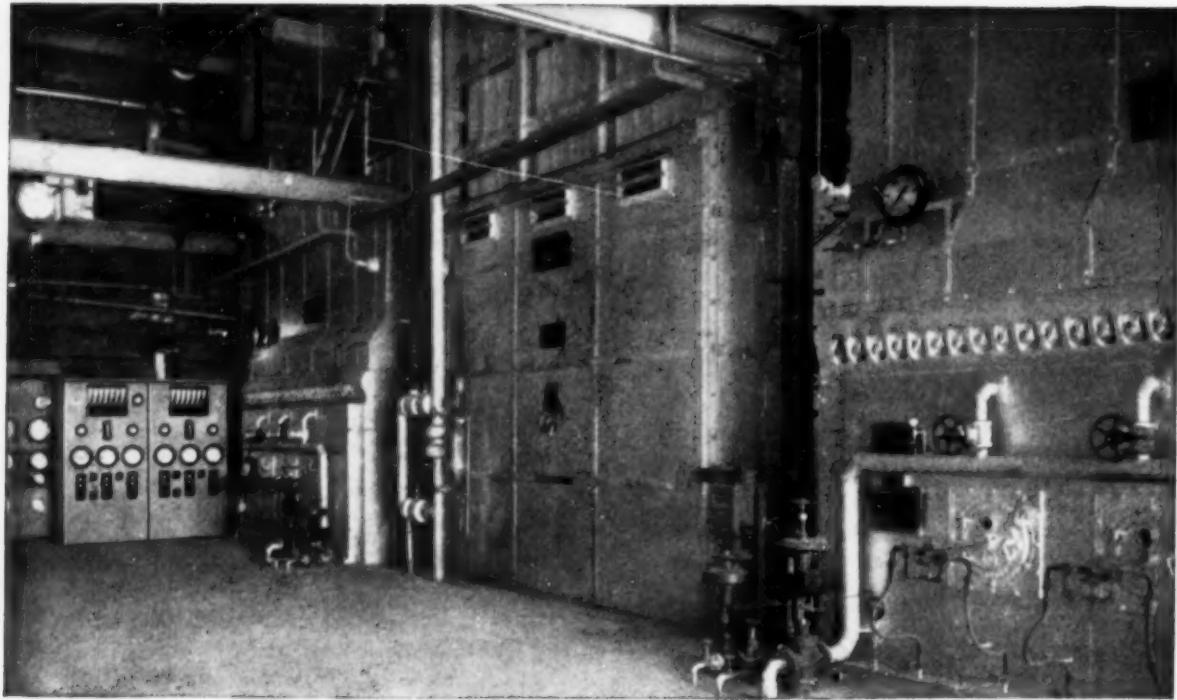
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POWER DIVISION: Tubular Dust Collectors, Forced Draft Fans, Air Preheaters, Induced Draft Fans, Fan Stacks



Stacks and Dust Collectors were project engineered by The Thermix Corporation.

You too can have specialized help in solving your dust and draft problems. Call or write Thermix today.



Boiler room at Kansas State College. Republic instrument panel is at left. Boilers are arranged for either gas or oil firing.

REPUBLIC

Automatic COMBUSTION CONTROLS

Go to College to Cut Steam Costs

At Kansas State College, a complete Republic combustion control system, feedwater level controls and instruments automatically operate two 50,000 pounds per hour boilers for maximum combustion efficiency. Fired by either oil or gas, these boilers generate steam at 225 psig and 500°F.

With Republic automatic combustion controls in this power plant, all loads, including "peaks", are met smoothly with steam output exactly matched to demand. Fuel costs per pound of steam produced are kept at a minimum 24 hours a day, seven days a week. Maintenance costs are kept low, too, by continuous proper operation of the boilers.

Whatever the size of your boiler, its draft arrangement, type or types of fuel to be fired and load conditions to be met, there's a Republic combustion control system that can bring these advantages to you. Our engineering staff, with more than 37 years *specialized* experience in combustion control systems, is at your service to help you get the system that exactly meets your needs. For your convenience, there's a nearby Republic field engineer to bring you all the facts. Write and make a date to see him soon.



Instruments on the control panel monitor boiler operation. If desired, the entire combustion system can be operated manually from this panel.

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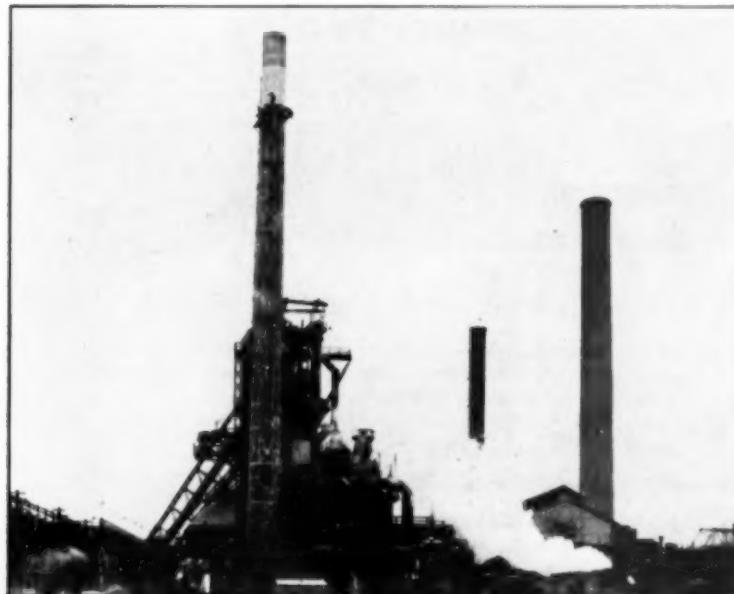
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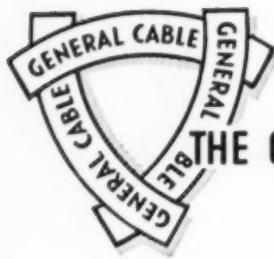
Maintenance Engineers and skilled workmen have the experience to recommend and provide you with the right solution to your chimney maintenance problems.

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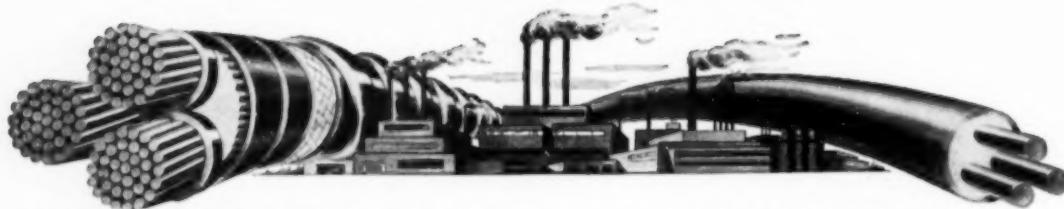
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THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

POWER TWINS

...Newest, Most Practical Team
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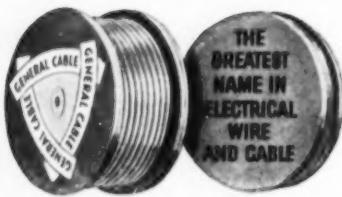
VARNISHED CAMBRIC OR RUBBER INSULATED CABLES

SAFETY M. I. WIRING SYSTEMS

The famous Power Twins combine lower installed costs with unique adaptability. They are ideal for electrical wiring without conduit in close areas and under, down and around beams and pillars...where power needs vary...where plant layout presents difficulties.

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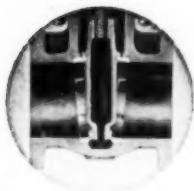
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Straight-Flow Port Design reduces fluid turbulence to a practical minimum.



Seat Rings of end-seated type are screwed into the body.



Sure-Grip Malleable Handwheel for non-skid gripping even with heavy gloves.

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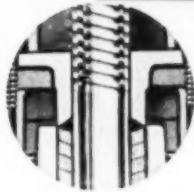
iron body gate valves

with screwed or flanged ends



For complete information on these new Walworth Iron Body Valves, see your local Walworth distributor, or write for bulletin 106.

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Brass Liner on Glands assures greater resistance to corrosion and scoring.

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valves and fittings

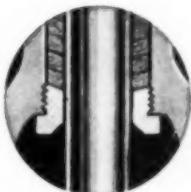
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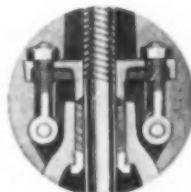
T-head Disc-to-Stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.



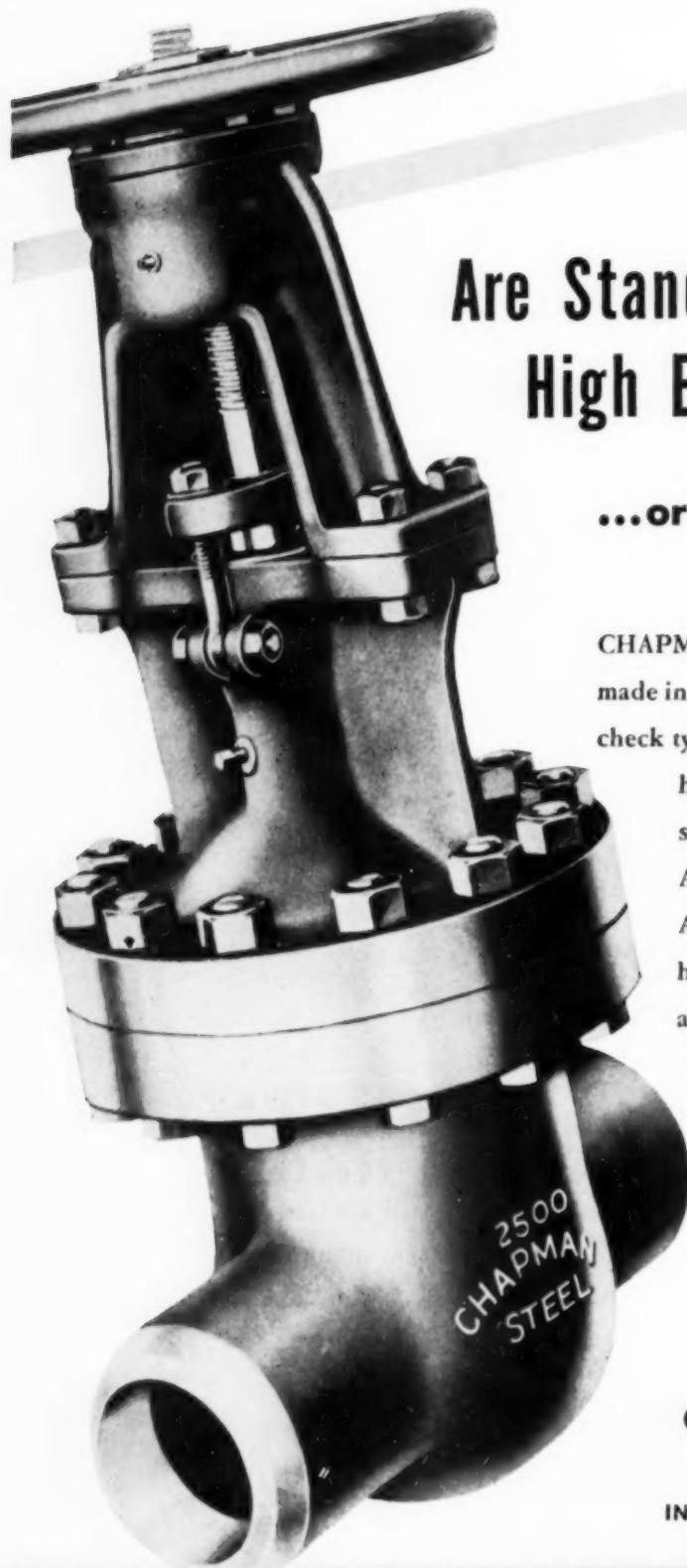
Bronze Back-Seat Bushings in bonnets of OS&Y valves.



Solid Web Type Disc in OS&Y valves for greater strength and longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.



Are Standard Pressures High Enough For You

**...or do you need special
steel valves?**

CHAPMAN CAST STEEL VALVES are made in gate, globe, swing and tilting disc check types . . . to handle the most severe high-pressure, high-temperature services. These valves are made to ASA and API ratings in all sizes. And on the special side, Chapman has everything needed to develop alloys and designs for *any* requirement. Do you have Catalog 20?

**THE
CHAPMAN VALVE
MFG. CO.**

INDIAN ORCHARD, MASSACHUSETTS

**YEAR BY YEAR, CHAPMAN WRITES NEW CHAPTERS
IN METALLURGY AND FLOW-CONTROL**

Timely Comments



Simmering on The Back of The Stove

WHAT'S TV, ANYWAY? It all depends on how you think of it. Does TV take you to the opera, or does it bring the opera into your living room? Think carefully. That's the key question that will determine whether I/TV has anything for you.

If It Takes You Places . . .

If you think of TV as something that brings something to you, then your life will be enriched by the entertainment and culture electronics can now bring you. But if you regard TV as an instrument that TAKES YOU PLACES, you will have an instrument with which to strengthen our economy, conserve energies, step up productivity, raise standards of living and increase everyone's income.

If TV takes you places instead of bringing places to you, you are of the breed and the mind of scientists, engineers, and industrialists of America. In I/TV there are wonders. Most of them are to come but some are already here.

A recent issue of the *York Report* (published by the York Engineering & Construction and York-Gillespie Manufacturing companies of Pittsburgh) discusses I/TV, or industrial television, as distinguished from E/TV, or entertainment television. And I/TV, it says, is simmering on the back of prosperity's stove.

Man-wracking operations in foundries, blast furnaces, open hearths bow to TV control. A man pours molten steel in comfort—a half block away and upstairs, each move determined by a picture on his TV screen. TV eliminates close-up operation often involving accidents, heat, error and waste. Another worker pushes slabs off a conveyor into slab-treating furnaces, safely in his remote control cabin, watching TV, hitting his target every time, with no crew to help. An electronic eye gazes unblinkingly, into the heart of a furnace. Is it ignited properly? Are burners functioning? Is the furnace

When TV is mentioned, we think of Godfrey, lovable Lucy, and Friday night fights, but not about TV's vast industrial potential.

product behaving correctly? A great TV show.

Cops and robbers? Well, RCA wanted to find out who was taking big television tubes from a stockroom. RCA, builder of I/TV equipment, was no shoemaker with unshod offspring. It mounted a closed-circuit television camera in the rafters and flooded the place with infrared light. The thief, unwitting and unwarned, walked in, picked up tubes, walked out and went right on to jail.

The Report cites many other uses of closed-circuit television, including the raising of the submarine *Affray*, introduction of new products by large companies, auctioning Florida fruit in a dozen cities at once, teaching surgery, checking military production, guarding prisons, verifying check signatures, and controlling smoke.

The day can come you may buy a house, farm, factory or a diamond for your wife without leaving your desk or doing more than flick a switch. Or you may buy a thousand shares of stock because what you see on your broker's closed circuit pleases you. Or you may hire your next secretary or executive vice president because of the qualities you perceive on your office screen.

They Just Won't Happen

The full potentials of I/TV will be realized only if we draw from the most creative imaginations and test the ideas in the reports of work, study, trial and error. The most valuable adaption may be so close before our eyes that we are overlooking it. Or it may be something so special that only one brain in a million can think of it.

The York Report concludes that no executive can afford to ignore industrial television, or neglect to explore possibilities of using it to speed, simplify or improve his plant production, or of linking of new or established products to the coming I/TV boom.

6 NEW
HORTON DIGESTERS
for cooking pulp

The sulphate pulp digesters illustrated in the accompanying views were built in our Birmingham shops for the St. Joe Paper Company at Port St. Joe, Florida. These digesters are 12 ft. in. diam. by 45 ft. 4 in. long overall. They were designed, built, X-rayed and stress-relieved in accordance with Paragraph U-68 of the ASME Code for Unfired Pressure Vessels.

Welded digesters are typical examples of the type of steel plate work we are equipped to build. We also fabricate and erect Horton elevated tanks, standpipes, reservoirs, flat-bottom tanks, Hortonspheres, Hortonspheroids, and other steel plate structures of carbon steel or corrosion-resistant materials. Our shops are equipped for X-raying and stress-relieving and we have facilities for pickling and painting fabricated steel plate work.

Estimates or quotations on any Horton welded steel plate structure may be had by writing our nearest office. There is no obligation on your part.

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Industry Speaks

SOUTHERN POWER
AND INDUSTRY

Mechanization and Electrification

"ONE OF THE most important considerations in the cause of increased productivity is that it pays off in **increased profit**. I've never heard of anyone being in business because he didn't want to make a profit, and I'm still old-fashioned enough to believe that a healthy, fair margin of profit is a necessity for the existence of industry. That's something we can be proud of.

"By its own definition . . . more and better goods at the lowest possible cost . . . it's easy to see how productivity is the greatest single ingredient in the formula that brings us higher profits. And, of course, higher profits mean a more bountiful and longer lasting prosperity for everyone.

"Hand in hand with profits goes the **competitive strength** a business maintains. Our free economy consists of hundreds of thousands of separate enterprises, from shoemakers to the manufacturers of railroad locomotives.

"Each of us is aware of what will happen if we ever find ourselves in the position where our competitor can offer lower cost, or higher quality goods than those we can market. And yet, even though every businessman knows what will happen under these circumstances, there are hundreds of businesses each year which are forced to fall by the way because they have failed to maintain their competitive position.

"In most cases these fatalities within the ranks of industry are due to lack of planning to provide for increasing productivity through adaptation of the cheapest, fastest methods of high quality production.

Let's Cut Costs—Show a Profit

"What are the means of developing an organization which will assure a strong foundation and consistent profits? We might look at a hypothetical case, say a mousetrap factory, to explore some of the possibilities.

"Let's assume that to show a profit in our mousetrap factory, we'll have to cut our cost for producing each mousetrap. There are several ways in which we can do it.

In the long run, there's only one way. This one-two punch will help lick today's problem of maintaining and increasing productivity.

"We can cut costs by **reducing wages**. That will bring down unit costs, surely. But, there's a catch.

"The mousetrap makers have a union . . . as who doesn't these days. No cutting their wages. And even if they weren't organized, they could go down the street to work in another factory where they would get the wages they demand.

"Well, maybe we can cut costs by having the employees work longer, and thus take greater advantage of our plant facilities. But we have to pay **overtime wages** then, and that **increases** costs. Overtime is not the answer.

"How about cutting down on the **cost of materials**. That cuts unit costs for a while—until the rejects pile up. Mousetraps are no good unless they'll catch mice.

"**Taxes?** Maybe we can get by a few taxes. No, better not.

"We might cut down on our **sales force**, instead. Salesmen take a big cut of the money that would come in. That'll help us show a profit. But that's an awful lot of mousetraps we've made. Good ones too, and no one's beating a path to our door to get them.

"No. There may be a lot of ways to cut costs, show a profit. For a while. In the long run, there's only one way.

"The most efficient, and quickest road to increased productivity and profits is through **mechanization and electrification**. Machines planned and installed to do more work at lower cost. Electric power is the most efficient and the most economical power to keep the machines running at optimum output. There is the one-two punch that will help lick this problem of maintaining and increasing productivity."

Adapted from the keynote address by S. L. Drumm, vice president, New Orleans Public Service, Inc., before the recent New Orleans Industrial Productivity Forum. Ten speakers, each a specialist in industrial productivity, appeared in the one-day forum, sponsored by Louisiana Power & Light Company, New Orleans Public Service Inc., and the General Electric Company.



PLASTIC PIPE LINE

CORROSIVE well water will be conducted through Tenite butyrate plastic pipe, in one of the first industrial installations of its kind,

by Carolina Power and Light Company at their new Wilmington Steam Electric Generating Plant, Wilmington, N. C.

Tenite butyrate pipe used by Carolina Power and Light Company for conduction of corrosive water. Quarter - of - a - mile line to operate at 50 psi.

The butyrate plastic pipe line, more than a quarter of a mile long, will deliver water from its source to large tanks where the water is to

SOLVENT CEMENT is applied to the pipe and the slip-sleeve couplings to make welded joints. It was necessary to cut the last length of the plastic pipe to fit. An ordinary hand saw was used.



PLASTIC PIPE is joined together in a continuous length on top of the ground before being lowered into the ditch, which is 30 in. deep.

be decarbonized. The water to be conducted is air saturated and contains a high percentage of carbon dioxide (CO₂). In the decarbonization process, the air and gas will be dispersed and the water will ultimately be used for all facilities of the new generating station.

Extruded of Tenite butyrate plastic, the corrosion-resistant pipe line has an inside diameter of 3 in. The 20 ft lengths were joined together by slip-sleeve couplings and solvent cement which provide, in effect, welded joints. It was not necessary to thread any of the couplings or pipe.

The speed with which the butyrate pipe was joined, and the ease with which it was handled, due to its light weight, made it possible to install the pipe line in less than half the time it would have taken with metal. Material costs were also considerably lower. Red brass pipe, the material originally considered for the line, would have cost almost twice as much as the butyrate plastic pipe.

It was necessary to cut the last length of the plastic pipe to fit. An



ordinary hand saw was used for this purpose. Where the line passed

under the railroad, it was protected
(Continued on page 92)

ONE MAN can easily handle the pipe. Before covering with earth the line was satisfactorily tested up to 70 psi. Quarter-of-a-mile pipe line was installed in less than half the time that it would have taken with metal.



Now a practical reality; first large-scale atomic plant authorized . .

An Appraisal of ATOMIC POWER

Reactions and fuels . . coolants . . power plant . . economics

ATOMIC POWER cannot be justifiably called "cheap" power under present economic conditions. Before one can proceed with a reliable atomic plant cost analysis, engineers and metallurgists will need to solve many challenging problems. However, none of them are insurmountable and in time they should be solved.

MANY OF THE ANSWERS will be found when the first large-scale atomic power plant, recently authorized, goes into operation.

WITH THE PROSPECT of early development of an atomic power plant, plant engineering personnel will be especially interested in establishing a general familiarity with the important aspects of atomic power.

THE recently announced decision of the Atomic Energy Commission to proceed with the design and construction of a large-scale atomic power plant has removed the prospect of atomic power from the realm of pure conjecture. Atomic power now promises to occupy, in the very near future, a position of economic, political and social significance. One can now hope that the arrival of atomic power as a practical real-

Basic Concepts of Nuclear Reactions

Nuclear fission is said to take place when the nuclei of certain heavy elements capture free neutrons which cause the nuclei to split into two fragments, known as fission fragments, attended by the release of neutrons and a large amount of energy. The important fissionable elements are: U-235 (uranium-235), Pu-239 (plutonium), and U-233 (uranium-233). Fertile elements undergo spontaneous fission at a very slow rate and by radioactive decay are transmuted into fissionable elements. For example, when the nucleus of U-238 absorb a neutron, beta decay follows and the fissionable element Pu-239 is obtained. Similarly Th-232 (thorium-232) yields U-233 which is fissionable.

Now natural uranium occurs as a mixture of 0.006 per cent U-234, 0.71 per cent U-235 and 99.28 per cent U-238. In order to use pure U-235 as a fissionable element it is necessary that it be removed from the natural uranium by a complex and expensive chemical or physical process. These processes were used originally at Oak Ridge to obtain U-235 as the fissionable element for the atomic bomb.

It is important to note, however, that the electrical energy required for these separation processes approaches in magnitude the quantity of electrical energy which could be generated eventually in an atomic power plant using U-235 as a nuclear fuel. Furthermore the reserves of U-235 are limited which would make the development of atomic power somewhat fanciful.

Fortunately, there is no particular advantage in using

U-235 as the fissionable element, and a process of transmutation which provides Pu-239 or U-233 from natural nuclear fuels (natural uranium or thorium) is to be preferred since it eliminates the costly separation process needed for U-235. Also, the reserves of nuclear fuels are thereby increased manyfold. Pu-239 and U-233 may be very easily separated from the products of fission by a comparatively inexpensive and simple chemical process.

Fig. 1 shows schematically the fission of U-235. A neutron is captured by a nucleus of U-235 which, as noted earlier, causes the atom to split into two fission fragments with the release of energy and the emission of beta and gamma radiation. The fission fragments undergo beta decay to form stable nuclei and become the waste products of fission. One to three neutrons are released in fission to be captured by other nuclei of U-235 and thus sustain a chain reaction.

Only one neutron is required to sustain the reaction at a constant rate; another neutron may be used to transmute U-238 or Th-232 into a fissionable element. The third neutron may not be released or it may be lost from the reactor, absorbed accidentally by the reactor materials or, by design, in non-fissionable neutron-absorbing materials introduced to control the reaction rate.

Fig. 2 shows schematically the fission of Pu-239. The nuclear fuel used in this reaction is natural uranium. One of the neutrons released during fission is absorbed by a nucleus of U-238 to yield U-239 which undergoes beta decay to become successively Np-239 (neptunium) and

By JOHN F. LEE

Associate Professor of Mechanical Engineering
North Carolina State College, Raleigh, N. C.

The author, a recognized authority in power plants, is well suited to give a realistic appraisal of atomic power. Before entering the teaching profession six years ago, he was associated with Stone & Webster Engineering Corporation as an engineer and consultant over a span of eight years. He participated in the design of some of the largest steam power plants built in this country. It was at Stone & Webster shortly after World War II that he began his first surveys into the future possibilities of atomic power. This association with atomic power continues in his

teaching career at North Carolina State College where the first privately-owned nuclear reactor went into operation last fall.

Professor Lee received his undergraduate education at The Citadel and studied for his advanced degree at Harvard University. He is author of the textbook "Theory and Design of Steam and Gas Turbines" which was published by McGraw-Hill late last fall. He is also a co-author with Dr. Sears, an M.I.T. physicist, of two advanced books on thermodynamics which will appear next spring. Over a score of his papers have appeared in technical journals.

ity will parallel the swift development of the gas turbine resulting from the concentrated effort required by wartime necessity.

With the prospect of early development of an atomic power plant, plant engineers will be especially interested in the technical aspects of this new means for producing electrical energy. The purpose of this article is to establish a general familiarity with the important aspects of atomic power.

A detailed presentation is clearly impossible in a concise article, and for this reason a rather complete bibliography is provided for those who wish to pursue the subject further.

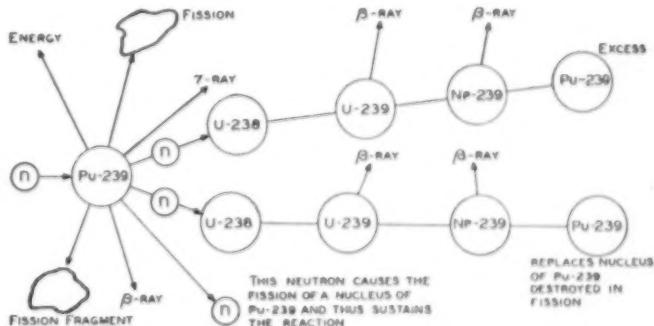
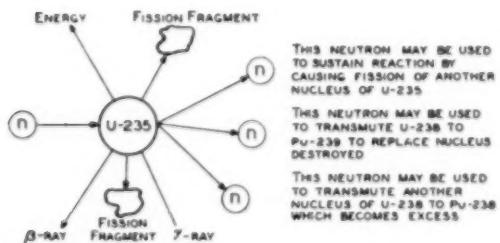
The essential difference between conventional and atomic power plants lies in the source of energy. Thus the nuclear reactor, in which fission of nuclear fuels with a release of energy occurs, supplants the furnace of the steam power



plant or the combustor of the gas-turbine power plant where the combustion of fuels is accompanied by a release of energy. We may assume tentatively that the rest of the power plant except for the heat exchanger, or boiler, is essentially unchanged.

Nuclear Reactors

Nuclear reactors may be classified according to a number of distinguishing characteristics. How-



finally the fissionable element Pu-239. This replaces the original atom of Pu-239 destroyed by fission. The transmutation of U-238 is given by the equation:



A second neutron is captured by another nucleus of Pu-239 to sustain the reaction. Neutrons in excess of two are utilized to transmute another nucleus of U-238 to Pu-239 which is excess and can be sold.

In a similar manner Th-232, which is another natural nuclear fuel, may produce an excess of U-233. The equation for this transmutation is:



where Pa is the symbol for protactinium.

The reaction described by Fig. 2 is known as a breeder reaction, i.e., fissionable elements are produced from fertile elements in excess of those required to sustain the reaction at a constant rate and the release of energy is a by-product. But, the power engineer looks upon the production of excess fissionable elements as the by-product.

The breeder reaction has several important advantages. First natural nuclear fuels may be used directly without the need for prior separation of the fissionable elements. In the second place more fissionable atoms are produced than are destroyed and hence the reserves of nuclear fuels are increased immensely.

On this basis the known reserves of nuclear fuels equals the coal reserves in terms of energy. Finally the excess fissionable elements produced may pay for the natural nuclear fuels used, an extremely important consideration.

ever, it is sufficient for our purposes to consider only a few of these characteristics. A reactor may be moderated (thermal reactor) or unmoderated (fast reactor) and it may be homogeneous or heterogeneous.

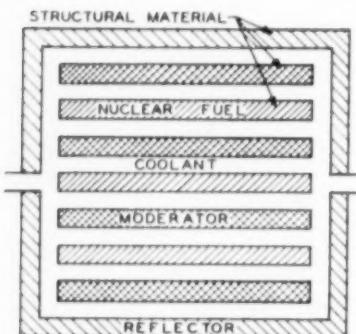


FIG. 3. Schematic representation of nuclear reactor.

Fig. 3 shows diagrammatically the principal elements of a reactor. The fissionable or fertile materials have been discussed in the section "Basic Concepts." A **moderator** is used in the so-called thermal reactor. Its pur-

pose is to slow down, through successive collisions with the moderating material, the high-velocity neutrons released in fission to thermal-energy levels before their absorption by fissionable or fertile nuclei.

A neutron released in fission has a velocity of the order of 12,000 miles per second which corresponds to a temperature of about 30×10^9 F. If the neutron is slowed down so as to be in equilibrium with a corresponding reactor temperature of, say, 1000 F the fission-capture cross section is about 350 times as large as when the neutrons are at the high velocity of 12,000 miles per second. This may be viewed as increasing the size of the target (the fissionable nucleus) 350 times from which it is clear that considerably less fissionable material is required.

A moderator must, of necessity, have a low-capture cross section in order to reduce the loss of neutrons through absorption on collision. Materials such as light or heavy water, carbon, and beryl-

lium or its oxide make very good moderators.

The moderated reactor is comparatively easy to control and the inventory of fissionable material can be smaller than in an unmoderated reactor. Nevertheless, despite the low-capture cross section of the moderating material, the moderator does serve as a source of loss for neutrons. Where a high breeding rate is desired this source of loss is eliminated by using an unmoderated reactor. Experience with the unmoderated reactor indicates a reliability equally as good as that experienced with the moderated reactor.

The reactor core is surrounded by a **reflector** to reflect stray neutrons, which would otherwise escape from the reactor, back into the core through scattering collisions. Any good moderating material makes a good reflector. However, the reflector may contain fertile material from depleted nuclear fuels (such as U-238 from depleted natural uranium) and in this way the stray neutrons can be used for breeding purposes.

Glossary of Atomic Power Terms

THE atomic power age has introduced its own names and terms, some of which may sound strange to the ears of power engineers. However, one can be confident that this strangeness will disappear in the not-too-distant future and these terms will become household words in the power world. In order to dispel some of the mystery of newness which surrounds atomic power terms, a few of the more important ones introduced in this article are defined.

ATOMIC MODEL—**Neutrons** are subatomic particles of mass with no electrical charge which form with **protons** (positively charged particles) a closely packed group called the **nucleus** of an atom. Outside the nucleus, but at relatively large distances from it, are negatively charged particles called **electrons**.

FISSION—When the impact of a high speed neutron on the nucleus of an atom liberates some of the neutrons in the nucleus with a release of energy, **fission** is said to take place.

FISSIONABLE ELEMENT—This may be any of the six elements which are known to undergo fission under neutron bombardment of their nuclei; i. e., uranium, thorium, plutonium, bismuth, protoactinium, and lead.

FISSION FRAGMENT—When the nucleus of a fissionable element is bombarded with a neutron the nucleus splits to form new elements or isotopes which are known as **fiSSION FRAGMENTS** or **fiSSION PRODUCTS**. For example, when the nucleus of uranium undergoes fission, over a hundred different isotopes of more than 20 elements are detectable among the fission fragments.

FERTILE ELEMENT—An element which is not in itself fissionable but when its nucleus is bombarded by a neutron it is transformed into a fissionable element.

NATURAL NUCLEAR FUEL—A mixture of fissionable elements, fertile elements, and impurities obtained after refinement from the ore.

BETA DECAY; GAMMA DECAY—The voluntary emission of beta and gamma radiations from an element results in its spontaneous change to another element. This process is known as **beta decay** or **gamma decay** as the case may be.

MODERATOR—A substance having an ability to absorb neutrons without undergoing fission. Hence a moderator is used to slow down the nuclear reaction rate by removing neutrons which otherwise might bombard the nucleus of a fissionable element.

Thermal Reactor—A reactor which utilizes a moderator to control the reaction rate is called a thermal reactor.

FAST REACTOR—An unmoderated reactor in which nuclear reaction proceeds at a steady rate.

REFLECTOR—A material used to prevent the escape of stray neutrons from the reactor.

HOMOGENEOUS REACTOR—A reactor in which the nuclear fuel is introduced in a homogeneous solution with a moderator is called a **homogeneous reactor**.

HETEROGENEOUS REACTOR—If the nuclear fuel is introduced into the reactor separately, and is isolated from other materials in the reactor, such a reactor is said to be **heterogeneous**.

The fissionable, fertile and reflector materials (also moderators if used) must be supported by some **structural material** which has adequate strength, durability, and a low-capture cross section. Furthermore, the structural material must be corrosion and erosion resistant and at the same time protect the nuclear fuel, moderator and reflector from the corrosive and erosive effects of the coolant.

When one considers all of these requirements which must be satisfied at high temperatures in power reactors, the magnitude of the metallurgical problems is at once clear. Steel would appear to be a suitable structural material but its high-capture cross section makes it unsuitable for breeder reactors. Magnesium and aluminum are undesirable because of their comparatively low melting points and their poor resistance to corrosion. Zirconium appears to meet all of the requirements quite satisfactorily but its purification is an expensive and difficult process. Unpurified zirconium is not much better than steel with respect to neutron-capture cross sections.

The need for a completely satisfactory structural material at temperatures of 1000 F or greater has not been fully met. This is one aspect of reactor design which contributes greatly to high costs.

In the **homogeneous reactor** the fissionable and fertile materials are intimately mixed in a liquid moderator. This type of reactor offers the obvious advantage of permitting the flow of fuel into the reactor and the flow of the spent fuel to a processing station where fissionable materials are removed. However the solution must flow through heat exchangers to be cooled, creating the need for a completely tight and reliable system to prevent the coolant from becoming contaminated.

Since a moderator must be used to carry the nuclear fuel in a liquid mixture, the problem of the parasitic loss of neutrons is present even when a moderator of low-capture cross section is used. However this might not be too high a price to pay for the advan-

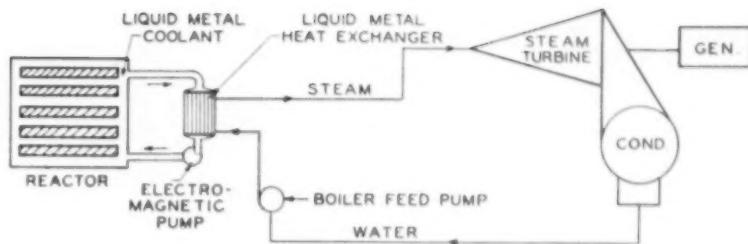


FIG. 4. Schematic arrangement of atomic steam power plant.

tage of a continuous or bulk-flow process.

The **heterogeneous reactor** requires that the nuclear fuel be prepared in lumps or in tubular shape and be kept separate from the other materials in the reactor. The lumps may be placed in metal tubes or the tubular fuel elements, if used, can be inserted in tubular channels arranged in the reactor to accept them. The moderator may be omitted. The disadvantage of this type of reactor is that the fuel and the spent charge must be removed by remotely operated mechanical means. On the other hand, the possibility of omitting the moderator is an advantage for a breeder reactor.

Coolants

The type of coolant used to remove heat from the reactor is a matter of important concern to the power engineer and therefore merits special attention. The coolant can possibly serve the dual purpose of cooling the reactor and at the same time act as the working fluid of the power plant. If we accept this viewpoint then we must consider only coolants which can satisfactorily meet these two objectives.

From the standpoint of the reactor the coolant must have a low-capture cross section and a change of phase cannot be permitted. It was noted earlier that ordinary water has a low-capture cross section and therefore would appear to suit the purposes quite well. Unfortunately, steam has a very much lower capture cross section and the abrupt change in this characteristic as well as in the heat flux when water is generated into steam in the reactor cause serious disturbances in the opera-

tion of the reactor. A possible solution is to use very high pressure water so that steam is not generated in the reactor. This, however, is not practical because it would require that the reactor be pressurized.

Still another possibility is to use a suitable gas such as helium or argon as both the coolant for the reactor and the working fluid for a gas-turbine power plant. Only moderate pressures would be involved. This possibly will be an attractive coolant when reactors are designed to operate at higher temperatures. It appears that the limit imposed at present on reactor temperature because of the structural materials is about 1000 F. This is hardly a high enough temperature for the efficient operation of a gas turbine power plant. Another difficulty encountered when gases are used is the need for providing a large heat transfer surface because of the comparatively poor transport properties of gases. This means a large reactor.

A most serious objection to the use of a common coolant and working fluid for the power plant is the fact that the coolant becomes radioactive thus posing difficult maintenance problems in the power plant itself. If we abandon the requirement that the coolant serve also as the working fluid in the power plant, then a number of problems can be eliminated.

A substance which exhibits desirable characteristics for a coolant may be used for that purpose and by means of a heat exchanger, heat may be then transferred to a more suitable working fluid for the power plant. A number of coolants have been suggested but

(Continued on page 108)

Decreased accident rate measures
success of program . . .

How SAFETY INSPECTION Paid Off

at Hanes Dye and Finishing Co.—Winston-Salem, N. C.

SAFE working conditions for employees is not a new idea at Hanes Dye and Finishing Co., Winston-Salem, N. C.—the company has twice won awards from the N. C. State and U. S. Departments of Labor for safety records substantially better than the average for its industry.

However, since management would not be satisfied until the number of accidents was reduced to as near zero as possible, a concerted effort was started in January, 1953, to better the already outstanding records.

Under the supervision of *S. Paul Meadows*, Hanes' personnel director, plans for an expanded safety program were mapped out and were put into operation on January 1,

- Emphasis placed on proper storage of materials and equipment, disposal of trash and clean floors.
- Existing employee safety suggestion system expanded by giving increased awards
- Unannounced inspections (demerit system basis) throughout the plant by safety committee.

1953. Since plant housekeeping and cleanliness go hand-in-hand with safety, particular emphasis was placed on proper storage of materials and equipment, clean floors and other work areas, and proper disposal of trash and waste.

A plant safety committee, which was formed in March, 1949, has the primary responsibility for safety

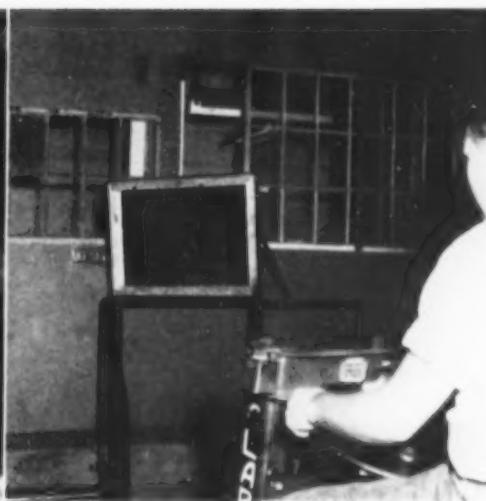
inspections of the plant and for making safety recommendations to supervisors and company officers. Other company groups are giving increased attention to safety problems. The already-existing safety suggestion system for employees was expanded by giving increased awards for accepted suggestions.

Classes in first aid have been given at the plant for about two years. A plan is soon to be put into operation to utilize personnel trained in these classes to give expert, on-the-spot first aid when accidents occur anywhere in the plant.

DEPARTMENT	GRADE ON HOUSEKEEPING & CLEANLINESS						NO. OF ACCIDENTS TOTAL THIS PERIOD JAN. 1, 1953 TO DEC. 31, 1953	NO. OF ACCIDENTS JAN. 1, 1953 TO DEC. 31, 1953	PERCENT OF ACCIDENTS DUE TO SAFETY DEFICIENCIES	SUGGESTION MADE	
	Jan.	Feb.	Mar.	Apr.	May	June					
MAINTENANCE	33	92	75	70	70	70	8	3	2	13	ALBERT LUSK
GREY & BLEACH	30	86	74	74	78	80	1	3	5	9	CC CORNATZER
DYE	57	62	70	70	70	70	2	8	10	17	EF KELLY
FINISHING	57	80	79	76	76	76	8	2	2	13	
PUT-UP	46	65	73	71	71	71	1	1	1	3	
PACKING	20	74	94	100	100	100	1	1	0	3	
WAREHOUSE (NORTH STATE)	11	97	94	100	100	100	1	1	0	2	
SHIPPING	13	97	100	100	100	100	1	1	1	1	
RULES											
1. Departments to be graded monthly by Safety Committee											
2. An award of a 1/25% Defense bond to be made each month for the best safety suggestion turned in.											
3. An award to be made to each employee in department at end of 12 months with best safety record.											
Safety Committee to act as judges.											

SAFETY RECORD is prominently displayed on this big signboard.

Rating System Used in Plant Inspections		Demerits
Broken bottles anywhere		5
Protruding nails anywhere		5
Fire hazards		5
Improper storage of supplies and equipment		4
Improper or unsafe cloth storage		4
Unsafe practices		3
Bottles not in proper container		2
Pipe and metal pieces out of place		2
Rags not in proper container		2
Oily or slick floors		2
Improper use of container		2



THESE SAFETY SUGGESTIONS paid off—emergency valve (arrow) permits operator to shut off steam immediately if sizing boils over. Note goggles. Special containers (center photo) are provided for dry rags, wet rags, bottles, and trash. Mirror in the warehouse (right) lets operator of fork truck see another truck approaching around corner.

The basic working group in Hanes' safety program is the Plant Safety Committee, which includes four members. Permanent members are plant superintendent, *Paul Wood*; maintenance foreman, *George Wright*; and assistant personnel director, *Alvin Disher*. Each plant foreman serves in turn as the fourth member of the committee.

Once a month the committee makes a thorough inspection of housekeeping and safety conditions throughout the plant. Inspections are unannounced, and are not made on a fixed date. The inspection is based primarily on a demerit system, which penalizes a department for unsafe or poor housekeeping practices found within it. Demerits may also be given other than at regular inspection times, whenever a committee member spots instances of unsafe practices.

Each department is assumed to start with a point score of 100, from which is deducted the number of demerits assessed by the inspectors. Departments are then rated A, B, or C, as determined by their point score. A copy of the committee's report goes to the plant superintendent, and each department superintendent receives a report on his department. All point scores are posted on a bulletin board in a prominent part of the plant.

At the end of the year, an award is made to each employee in the department with the best safety record for the preceding 12 months. Typical awards are cameras, cigarette lighters, and clocks. One of each of these is permanently displayed under the safety bulletin board. Awards are based on the departments' grades for the year in housekeeping and safety, number of days lost because of accidents, and other safety factors. In making their decision as to the best department, the judges take into con-

sideration the hazards inherently present in each department; obviously, more accidents must be expected in some departments than in others.

Supervisory Council

The supervisory council is composed of all departmental superintendents, foremen, and assistant foremen. Its purpose is to "promote complete understanding among all departments and to welcome and study all ideas advanced for betterment of plant conditions and more efficient operation." It is operated according to the McCormick Plan for junior executives.

The council has a safety committee to which all employees' safety suggestions are referred. At a monthly dinner meeting, the council considers the safety suggestions recommended by its safety committee. Accepted suggestions are given a cash award on approval of the company officers, and each month the council awards a \$25 defense bond for the best suggestion submitted during that month.

Key Man Group

All supervisors, the two plant superintendents, the personnel director, and officers of the company are members of the key man group. The role of the key man group in plant safety is to receive at its

(Continued on page 104)



THESE BOTTLES not in proper container cost offending department 2 demerits when found by Plant Safety Committee.

**Better production with
push button heat . . .**

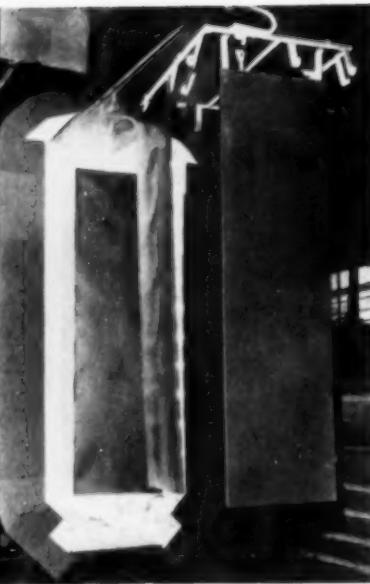
Infrared at Work

Modernizing baking operations to increase efficiency? These case studies show what infrared is doing for other Southern plants.

General Box Company, Meridian, Miss. — Infrared drying is employed to dry the painted sides of cottonwood bottle boxes prior to assembly. Operation is automatic from the time that the unpainted parts are fed into a hopper until the painted pieces

are taken from the conveyor and ready for assembly.

Drying time is approximately 5 minutes, varying with the color of the paint. Infrared drying zone consists of 250 watt lamps in 84 sections. Total electrical load is 84 kw. Infrared drying

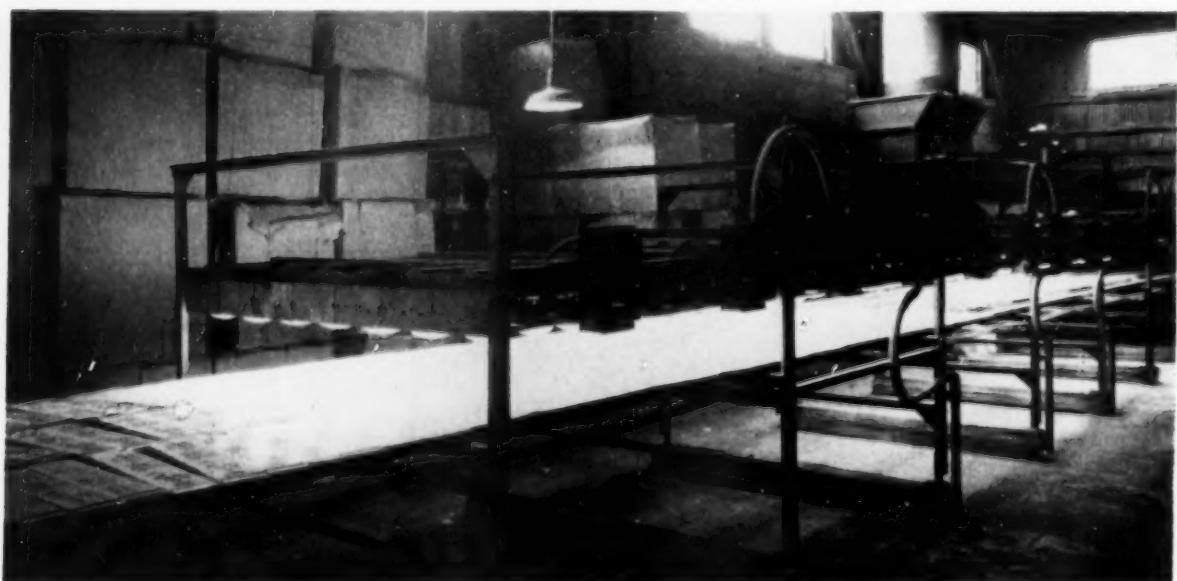


DEGREASING of metal cabinet parts at Lee Products Company in Baltimore, Md. Another infrared installation is employed for subsequent baking operations.

has been a big improvement over former air drying methods.

Lee Products Company, Baltimore, Md. — Infrared ovens are employed for the degreasing of parts and subsequent baking of white synthetic enamel on metal

INFRARED DRYING of painted sides of cottonwood bottle boxes at the General Box Company in Meridian, Miss. Drying time is approximately 5 minutes; total electrical load 84 kw.



cabinets. Degreasing unit is 12 lamps long and has 30 lamps in the cross-section (illustrated). Wattage of lamps is 375 with specular gold reflecting face plates forming a solid reflective wall surrounding the lamps to reflect rays from the opposite bank. Oven produces a uniform temperature of 600 F.

Cabinet parts are 66" high with base areas varying in size from 12 x 18" to 24 x 36". Suspended from a conveyor, they pass through the tunnel, or oven, at a rate which keeps them subjected to the heat for 2 minutes and 12 seconds. They emerge thoroughly degreased and blued.

New degreasing method has shown marked economies. Minimum floor space is required, conveying the cabinets through the oven is simple and inexpensive, time element is short and no water, fumes or steam result from the operation. Surfaces are fully prepared for the enamel except for wiping off a loose residue, which is accomplished in the short interval between the degreasing oven and spray booth.

After the cabinets are spray painted, they enter a second oven for baking. Oven is 14 ft long with 16 clear lamps in the cross-section, which produce a temperature of 320 F. Baking time is 6 minutes.

The two infrared degreasing and baking ovens have resulted in a reduction of 25% in operational costs. Another point of interest is that the ovens do not have to be insulated. A two-wall construction is employed which permits circulation of air to cool the lamp bases and sockets and to prolong the life of the entire electrical system.

Louisville Tin and Stove Company, Louisville, Ky.—Infrared oven bakes the enamel finish on portable ice refrigerators. Efficient layout is illustrated.

By FRANCIS A. WESTBROOK

Photos courtesy The Fostoria Pressed Steel Corp.

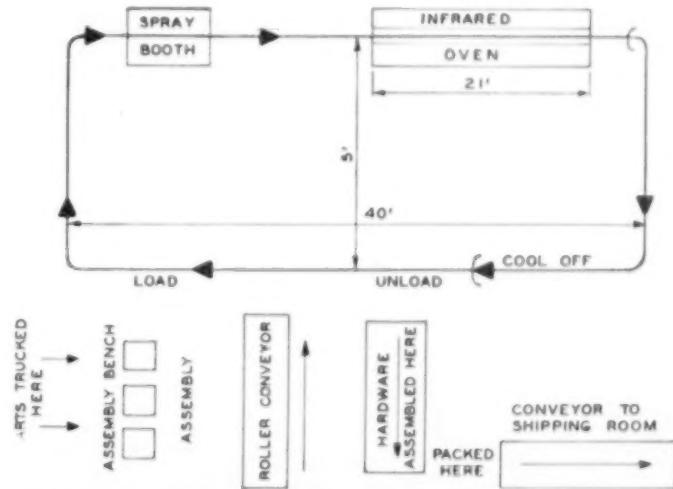
Parts are brought by industrial truck to the assembly point, which is adjacent to a Keystone Junior monorail overhead chain conveyor. Assembled refrigerators, 18 x 18 x 13", are suspended from the conveyor on 3 ft centers.

After being sprayed with red synthetic enamel (DuPont Dulux), refrigerators pass into the infrared oven, which is 21 ft long with 10 lamps in the cross-section. Lamps of 250 and 375 watts are used and baking takes 5 minutes at a temperature of 350 F. Refrigerators are automatically revolved during the baking operation.

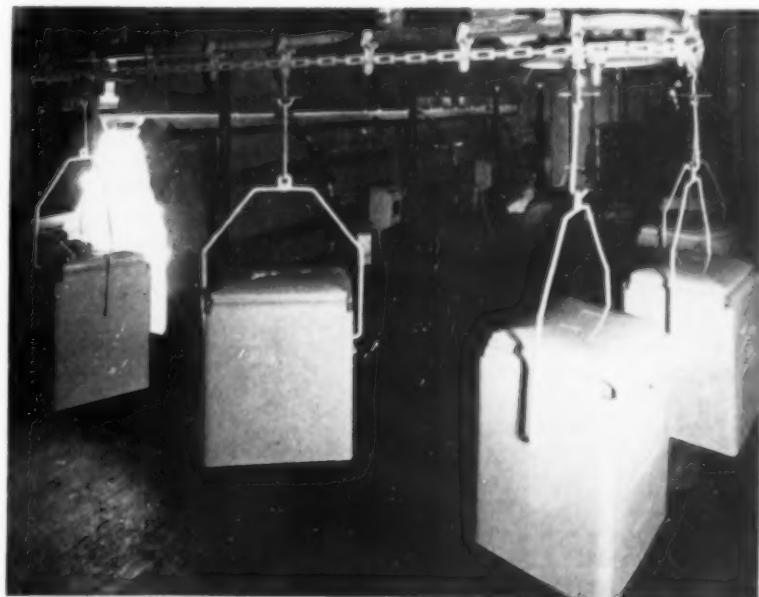
Following the baking, units travel on the conveyor for a short cooling off period before being unloaded, hardware added, and moved to shipping room.

Morrill Manufacturing Company, Dalton, Ga.—This manufacturer of chenille products applies a wet coat of latex rubber to the backs of throw rugs to keep them from slipping on the floor. In this infrared application, it is necessary to use air movement as well as heat to prevent burning and ease hardening of the latex before

(Continued on page 107)



EFFICIENT LAYOUT for handling portable ice refrigerators at the Louisville Tin and Stove Company in Louisville, Ky. Infrared baking oven is shown below.



**Utilities reappraise fire
fighting techniques . . .**

Fire Protection Demonstrations

At the River Junction Steam Plant, Gulf Power Company

RECENT IMPROVEMENTS in the art of fire extinguishment have been spectacular. Such developments as high velocity water fog and chlorobromomethane will result in a reappraisal of present fire fighting techniques for utility company plants. Moreover, higher steam temperatures and higher short circuit currents have created greater hazards.

PRINCIPAL MOTIVE for conducting these tests at the River Junction Steam Plant was to demonstrate to those interested in utility company fire protection problems that the fires most likely to occur can be controlled more effectively with these modern means than with equipment heretofore available.

Gulf Power Company and Southern Services Inc., in cooperation with Associated Engineers, conducted fire tests and demonstrations at the new River Junction Steam Plant, located in Northwest Florida on the Apalachicola River, October 7, 1953. This data has been adapted from Gulf Power Company's official report.

A semi-technical description of the fire protection equipment and methods of the River Junction Steam Plant will be featured in an early issue of SP&I.

Equipment and methods will be discussed by A. H. Mergenthaler of Southern Services, Inc.

THE River Junction Steam Plant of the Gulf Power Company is one of the first plants where full fire protection has been provided; water fog for oil fires and general fires, fixed carbon dioxide systems for fire in the 2300 volt and 575 volt switchgear, portable carbon dioxide and chlorobromomethane units for first aid.

Oil reservoirs, oil tanks, oil handling equipment and hydrogen equipment indoors are protected with remote controlled fog head systems by means of manually operated valves.

Danger points in the coal handling system, such as the crusher house, conveyor transfer points, etc., are protected by means of remote controlled fog head systems.

The water fog system is self-contained, having its own fire pumps; one gasoline engine driven and one electric motor driven and its own 150,000 gallon water storage tank. Well water is used for filling the fire tank in order to keep the piping system clean at all times.

TEST NO. 1—Extinguishment of Fire in Simulated Transformer Structure, Using Deluge Fog Tips.

The simulated transformer structure, consisting of steel and transite siding contained approximately 300 gallons of insulating oil in a steel pan at the top of the structure. Perforations and slots were provided

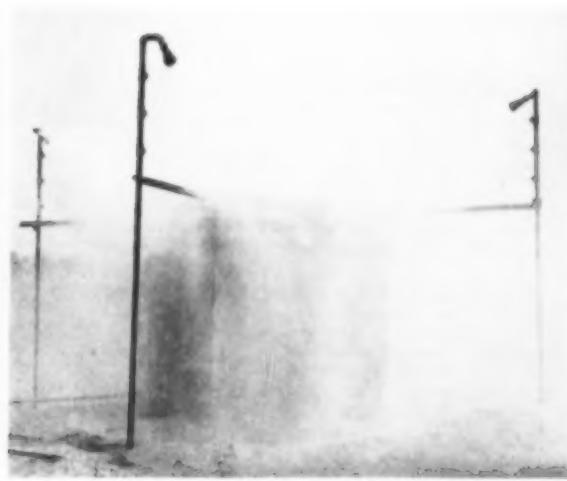
in the sides of the pan, approximately 5" below the rim in such a manner that additional introduction of oil into the tank would result in overflowing. The area below the structure, extending approximately 5 ft beyond the vertical sides of the structure, was dyked to permit formation of oil pools.

Four fog tips, Fog Nozzle International, Type FOA-100, having a capacity of 100 gpm each at 100 psi, were placed at each of the four corners of the structure, approximately 3 ft above the top and 5 ft to the side of the structure. A pipe manifold and a piping system consisting of two 3" pipes connecting the manifold to the pump house was provided. The two station fire pumps (1 Hale gasoline engine driven, 1 Worthington electric motor driven) permanently installed in the pump house were utilized. Control of the fog system was by means of manually operated gate valves in the two 3" feed lines, at a point approximately 100 ft from the structure.

The test procedure was as follows: The oil in the tank of the transformer structure was primed with gasoline and ignited. Oil soaked rags at the bottom of the structure were also primed with gasoline and ignited. Allowing an initial preburn of 2 minutes to raise the oil temperature, additional oil was introduced into the structure by means of a 25 gpm motor driven oil pump. The resulting overflow enveloped the entire structure in flame within 40 seconds and the fire was then permitted to burn an additional 4



TEST NO. 1—Fire in simulated transformer structure with 100 gpm fog tips at four corners. Fire is at its peak at



the left, fog just turned on. At the right, fire has been extinguished, fog still on.

minutes before the signal to turn on the fog system was given. The results obtained were as follows:

Water Pressure at Control Valve	125 psi
Water Pressure at fog tips (approx.)	115 psi
Contents of oil tank	300 gal
Capacity of oil pump	25 gpm

	Time
	Min. Sec.
Ignition	0 00
Initial preburn and start of oil pump	2 00
Complete envelopment	2 40
Water on System	6 40
Control of Fire	6 45
Complete extinguishment	7 04

Summary: With a water pressure of 125 psi at the control valve allowing a total preburn of 6 minutes 40 seconds, complete extinguishment was effected in 24 seconds. A total of 168 gallons of water was used for extinguishment and approximately 75 gallons of oil were consumed.

The fog tips used in this test are identical with those used for the protection of the power transformers in the plant.

TEST NO. 2—Gasoline Fire in Trench, Using Fog Curtain

The purpose of this test was to demonstrate the effectiveness of a fog curtain placed transversely across a trench in which gasoline was ignited. The trench was approximately 12 ft long, 3'-6" wide and 6" deep. Midway the long dimension, a fog head, Fog Nozzle International Type D-24 having a capacity of 24 gpm at 100 psi was placed, approximately 7 ft above the trench, in such a manner as to produce a transverse fog curtain.

The trench was filled with oil and gasoline to within 3" of the top. The pipe structure supporting the nozzle was connected to the water supply and, with a pressure of 105 psi at the control valve (ap-



TEST NO. 3—Extinguishment of oil spill fire using 1½" hand line and fog nozzle.



THESE FOG HEADS were used in Tests Nos. 2 and 5.

Florida Fire Tests . . (continued)

Fire protective installation at the River Junction Steam Plant of the Gulf Power Company was designed by **Southern Services, Inc.**, Birmingham, Alabama, under the direction of **A. H. Mergenthaler**, principal electrical design engineer, in cooperation with **Joseph Roubicek of Associated Engineers**, New York City and Birmingham, Alabama.

These tests were conducted under the direction of **Joseph Roubicek**. Official timekeepers were **K. W. Boyles of Southern Services, Inc.** and **J. D. Chichester of Associated Engineers**.

Valuable assistance was rendered in matters pertaining to underwriters requirements and standards by **C. N. Hagar** of the **Great American Insurance Company**, New York City, **H. D. Long** of **Southern Services, Inc.**, Birmingham, Alabama, **H. N. Pye** of the **Southeastern Underwriters Association**, Atlanta, Georgia and **W. O. Mandlett** of the **Edison Electric Institute**, Insurance Committee, Richmond, Virginia.

proximately 100 psi at the fog head) the fog curtain was started. Simultaneously, the gasoline was ignited in one corner of the trench. The flames promptly swept to within 10" or 12" of the transverse fog curtain but did not penetrate it. After two minutes, the fog curtain was discontinued, and within 8 seconds the entire trench was involved in flame. The fog curtain was then re-established, thus cutting the fire area in two halves.

The two fire areas were separated by a strip approximately 2 ft wide in which no fire existed, this strip representing the width of the fog curtain. Using a 1½" hand line with a fog nozzle, the fire in the area which had been ignited originally was extinguished. Again, the fire in the burning portion of the trench did not penetrate the fog curtain. After an additional two minutes, during which the fire was confined to the burning portion of the trench, the fire was extinguished.

This test demonstrated the ability of a curtain-type fog head to effectively screen a burning flammable liquid area. Fog heads of this type are used in the plant on the turbine oil reservoirs to isolate them and to control or contain a fire.

TEST NO. 3—Extinguishment of Oil Spill Fire Using 1½ Inch Hand Line and Fog Nozzle

The purpose of this test was to demonstrate the effective use of a 1½" hand line with fog nozzle on an oil spill fire in an area approximately 25 ft long by 15 ft wide. This area was dyked on three sides and one barrel (55 gal) of transit oil and one barrel of Diesel oil were permitted to soak into the ground.

At the beginning of the test 25 gal of Diesel oil were spilled on the oil saturated ground so as to form pools covering most of the area. This surface was then primed with 5 gal of gasoline and ignited. After a pre-burn of 1 minute and 30 seconds, the signal was given to start extinguishment. Extinguishing operations were performed by two Gulf Power Company maintenance employees.

The entire demonstration was timed as to speed of connecting 2 lengths of hose, fog nozzle and putting water on the fire, as well as complete extinguishment. The time consumed was as follows:

To break out 2 lengths of 1½" hose from standard Gulf Power Company portable hose rack, connect hose to hydrant, couple hose, attach fog nozzle, turn on water 20 seconds
To completely extinguish fire thereafter.....
..... 28 seconds
Total elapsed time, using two men..... 48 seconds

TEST NO. 4—Same as Test No. 1 Except Water Pressure 75 psi at Control Valve

This test was conducted under practically duplicate conditions as Test No. 1 except that a lower water pressure was used. The water pressure was held to a maximum of 75 psi at the control valve, but, during the test, dropped at times to 64 psi. A total pre-burn of 5 minutes and 45 seconds was allowed. Control of the fire was established in 9 seconds and complete extinguishment was obtained within 1 minute and 5 seconds thereafter. Total elapsed time was 1 minute 14 seconds. Total water used, approximately 370 gallons. Total oil used, approximately 75 gallons.

TEST NO. 5—Demonstration of Discharge Patterns of Small Fog Heads

This demonstration showed the patterns of discharge obtained by small fog heads used throughout the plant. The same pipe structure, previously used for Test No. 2 was utilized. In addition to the curtain type nozzle, demonstrated in Test No. 2, the discharge pattern of a 1½" Type 5DP34 fog head was shown. The same has a capacity of 34 gpm at 100 psi, producing a fine fog with good projectional characteristics. It is used in the plant for the protection of the oil conditioners, the coal crusher house, the coal conveyor transfer points, as well as for footing protection of the outdoor transformers.

In an additional test, the discharge pattern of a 3½" Type B-28 fog head was demonstrated. This head produces an umbrella shaped pattern of dense fog. It has minimal projectional value and relies primarily on area penetration as a means of extinguishment through heat absorption. This head is used in the plant for the protection of the hydrogen seal oil units and the turbine oil storage tank.

TEST NO. 6—Demonstration of Chlorobromo-methane Portable Extinguishers

These tests were conducted to demonstrate the value of first aid CBM extinguishers on power plant hazards.

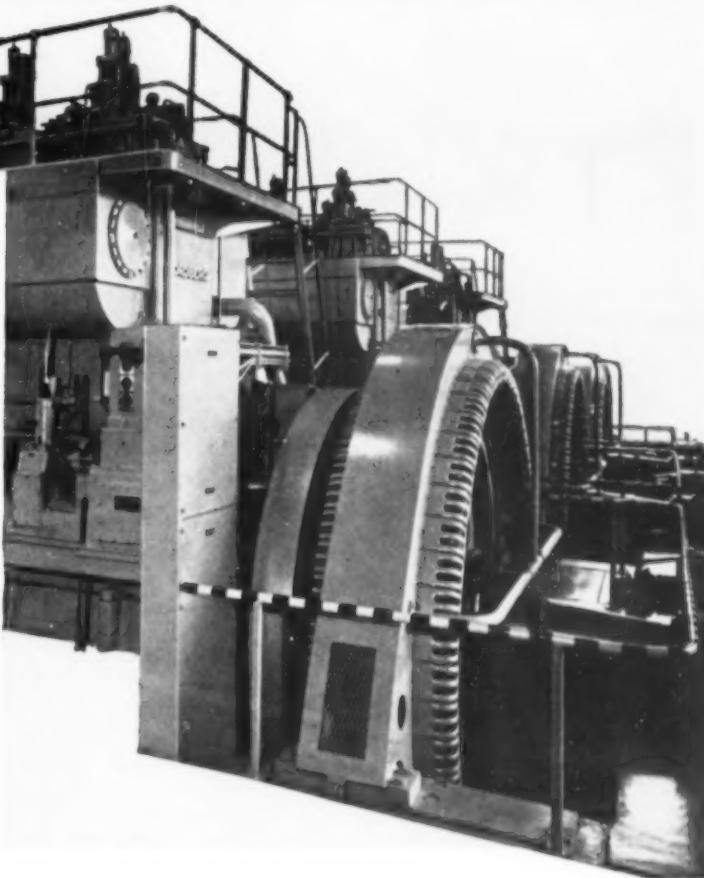
- An oil drum, split in half lengthwise, was filled with gasoline within 6" of the rim and ignited. After a pre-burn of 2 minutes, the fire was extinguished by a plant maintenance man in 3 seconds, using a 1 gallon Stop Fire Inc. CBM portable extinguisher. Approximately 1 qt of CBM fluid was used for extinguishment.
- The test was repeated, and extinguishment was obtained in 2 seconds.

(Continued on page 64)

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TEST NO. 6A (left)—Demonstration of 1 gallon chlorobromomethane extinguisher. TEST NO. 6C (right)—demonstration of 1 quart chlorobromomethane extinguisher.



Note flame separated from tub, indicating speed of extinguishment.

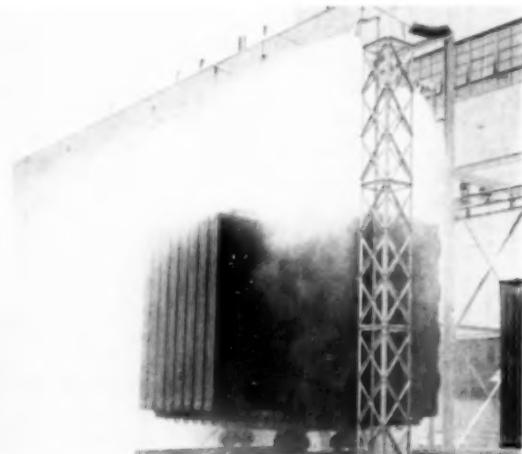
Photos courtesy of the Gulf Power Company.

- (c) A 2 ft diameter tub, filled with gasoline to within 10" from the top, was ignited and a pre-burn of 3 minutes was given. This fire was extinguished, using a Stop Fire Inc. 1 qt CBM portable extinguisher, in 2 seconds.
- (d) The test was repeated with identical results.
- (e) A gasoline spill fire, covering an area of approximately 10 ft by 4 ft was extinguished by means of a 1 gal Stop Fire Inc. CBM extinguisher in 4 seconds. The holding action of CBM was shown by stopping the CBM discharge prior to complete extinguishment. It was noted that no reflash occurred for an appreciable period of time although the fire in the unextinguished portion of the spill continued to burn.
- (f) A bundle of oil soaked rags was suspended about 11 ft above the ground, primed with gasoline and ignited. This fire was extinguished by training the CBM discharge on the fire from the ground, demonstrating the operating range of the unit.

All CBM units used in these tests were pressurized with CO_2 and are identical with those provided throughout the plant for first aid purposes.

TEST NO. 7—Operation of Deluge Type Fog Tip System on Main Power Transformer, Using Gasoline Engine Driven Fire Pump

The deluge type fog tip system installed for the protection of power transformer No. 2, consisting of five 100 gpm deluge fog tips and two 35 gpm footing protection fog heads, was tested to observe the coverage and pattern of the fog discharge, as well as to determine the actual time required to put the system in operation in case of fire. Inasmuch as the system is of manual rather than the automatic type, the time required included the manual starting of the gasoline engine driven pump, approximately 250 ft distant from the control room where



TEST NO. 7—Fog on a 45,000 kva power transformer.

the signal to proceed was received. It also included the time required to operate the hand wheel type gate valve that controlled the fog discharge.

Two operators were stationed in the control room of the plant. A signal, simulating a trouble alarm at the control board, was transmitted, indicating fire in the transformer. One of the operators proceeded to the pump house and started the gasoline engine driven fire pump. The other operator proceeded to the fog system control valve in the switchyard, approximately 100 ft from the transformer and opened the control valve to put fog on the transformer.

The total elapsed time, from the time the signal was received until fog was actually discharged on the transformer, was 35 seconds.

The fog discharge was maintained for a period of 5 minutes to enable observation of its characteristics and it was noted that the transformer was completely enveloped in dense fog. Water pressure at the fog tips was approximately 100 psi.

(Continued on page 66)

Certified Smokeless Detroit RotoGrate Stokers . . .

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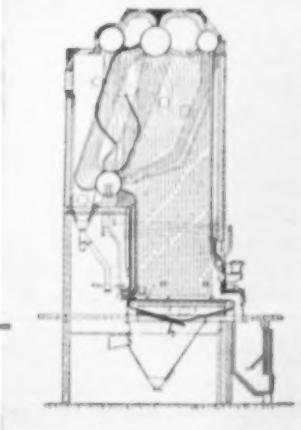
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Florida Fire Tests . . (continued)



TEST NO. 8—Fog on station service transformer.

Fire Tests and Demonstration Conclusions

WE ARE convinced that the operation of **large overhead fog tips** will control a fire on the top and sides of a transformer, regardless of its size. Such a system is preferable, from the cost as well as the operation standpoint, to one consisting of a large number of fixed fog heads surrounding the transformer.

The new, simplified system of fog protection blends into the substation structure to such an extent that it is barely noticeable, thus presenting a neat and attractive appearance as compared with the old system, employing the so-called "Bird-Cage" piping arrangement. However, hand lines with fog nozzles are definitely required since variations in the wind directions, as well as the need for taking care of possible oil run-off, require mopping up by hand.

We also know that **danger areas indoors** will require isolation by means of fog screens. This will prevent possible development of dangerously high temperature areas, keep smoke down and permit personnel to approach the seat of the fire.

The transformer fire tests No. 1 and No. 4, as well as tests previously conducted, prove the desirability of **ample water pressure** (not less than 90 psi) at the fog tips for best results. Within limits, up to about 150 psi, faster extinguishment will be obtained as pressure increases and total water consumption for complete extinguishing will be less in spite of the higher gpm flow rate. The determining factors, such as the size of water particles produced, the velocity with which they impinge on the burning surface and the flow rate in gpm, all of which vary with pressure, must be properly weighed in order to obtain effective coverage and penetration with a minimum number of fog tips at an optimum pressure.

Unless an existing water supply system is capable of producing, at all times, **satisfactory flows** at

TEST NO. 8—Operation of Deluge Type Fog Tip System on Station Service Transformer No. 2, Using Gasoline Engine Driven Fire Pump

A test similar to No. 7 was conducted on this unit. This deluge fog system consists of two 250 gpm fog tips. The total elapsed time required to obtain fog discharge over the transformer was 41 seconds. Approximate water pressure at the fog tips was 110 psi.

TEST NO. 9—Operation of Deluge Type Fog Tip System on Main Power Transformer, Using Remotely Started Electric Motor Driven Fire Pump

This test was similar to Test No. 7, except that the electric motor driven pump was utilized. The pump was started from a remote control push button station in the control room rather than in the pump house. The total elapsed time required to obtain fog discharge over the transformer was 29 seconds. Water pressure at the fog tips was approximately 125 psi.

designated pressure, suitable fire pumps and adequate clean water storage must be provided. In our opinion, a fire pump for power plant protection should have a capacity of not less than 750 gpm at 175 psi.

A 1½" hose line, with fog nozzle, is very effective on a **large oil fire**. It is easily handled by two operators with limited fire training. In an emergency, it could be operated by one man. 2½" hose lines would be most difficult to handle in a power station. Solid streams should not be applied on oil fires and should not be used in the vicinity of electrical equipment.

While a modern fog system will form an excellent backbone of fire protection in generating plants, the **first and second line of defense** consisting of portable CO₂ and Chlorobromethane units for handling a fire in its incipiency, as well as fixed CO₂ systems for the protection of station service switchgear and also the indoor oil tanks by means of CO₂ hose reel assemblies, should not be overlooked.

Metal-clad switchgear is not fireproof. A fire resulting from a short circuit in this type of equipment is extremely difficult to control unless fixed CO₂ systems have been provided.

An **effective and dependable fire protective system** in a modern steam generating station is expensive. It is a good investment only if the personnel understands this equipment and is fully trained in its use. Some of the indoor fires, especially those involving the turbine lubricating oil equipment, could be serious. The training should, therefore, be carried to a point where the men, while still respecting a fire, have lost their natural fear of attacking it, regardless of the location. To accomplish this, a course such as provided at the Naval Damage Control Centers, where each trainee extinguishes several large fires in a simulated engine room, is recommended. Periodic fire drills to keep the personnel fit for an emergency are essential.

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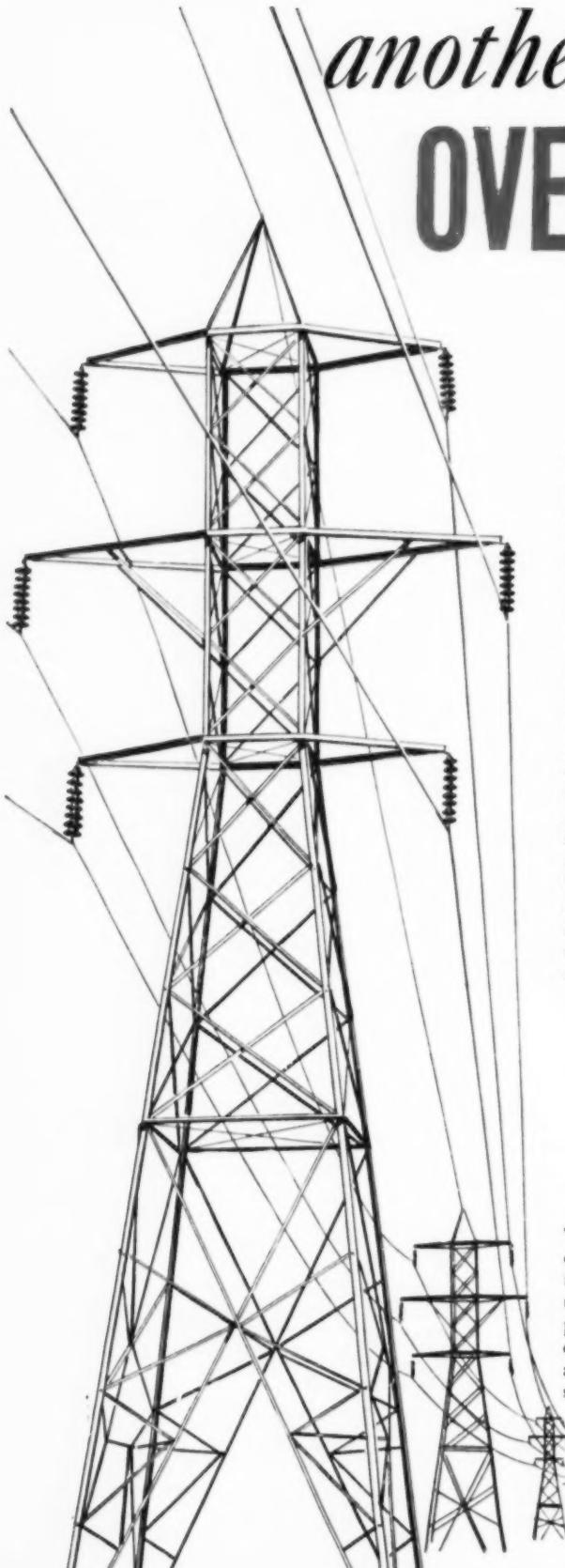
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Isefjord Power Co.
Jersey Central Power & Light
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Mississippi Power Co.
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**Electronics afforded a vast improvement
in effectiveness of dust removal . . .**

How Electrostatic Filters Work

*Comments on the behavior of the free electrons,
process of ionizing the dust particles, and the
precipitation or collection of these particles.*

By JAMES W. MAY

Technical Director, Air Filter Division
American Air Filter Company, Inc.
Louisville, Kentucky

AIR FILTERS are manufactured for many specific applications, with emphasis on certain phases of performance being dictated by the duty for which the filter is intended. Many filter applications require cleaning efficiencies of the highest possible order, and the continued quest for better performance has led the industry into the field of electronics.

Quite frequently the dust arrestance of an air filter is evaluated on the basis of the amount of weight of synthetic dust removed from an air stream during an accelerated test. This is a convenient means of testing filters and provides a basis for evaluating the performance of one filter as compared to another.

However, a filter may show a relatively high degree of dust arrestance by weight and at the same time be unable to remove a vast number of the extremely small dust particles which are the worst offenders from the point of view of discoloring the surfaces of the filtered space.

As an example consider the relative weights of a 1-micron and a 10-micron dust particle. A micron is the unit of measurement generally applied to dust particles and is approximately $1/25,000$ of an inch. Remembering that volumes vary as the cube of the diameters, the ratio of volumes of these two particles will be 1,000 to 1, and assuming the same specific gravity

for both, the large one will be one thousand times as heavy as the smaller one.

In other words, an air filter which has a cleaning efficiency of 80 percent by weight could conceivably pass two hundred fifty 1-micron particles for every single 10-micron particle removed. Unfortunately, the smudging and discoloration of walls, draperies, etc., are caused for the most part by these small-sized particles, because, due to their slight weight, they have little tendency to settle out by the action of gravity and therefore remain suspended in the atmosphere for long periods of time.

The advent of the electronic filter has meant a vast improvement

— Protons and Electrons —

IN discussing the fundamental mechanism of electrostatic precipitation it is well to first consider the basic structure of the atom. The present day conception is that the atom is made up of minute charges of negative electricity called electrons which revolve around a central core, or nucleus, in a fashion analogous to a miniature solar system. The nucleus represents the sun, and the electrons correspond to the planets. The nucleus is composed of minute positive charges of electricity called protons, together with other particles called neutrons, which in themselves have no net charge.

Reference is frequently made to electrons, protons, and neutrons, as being the building blocks of matter. For this discussion, it will suffice to consider only the protons in the nucleus structure, remembering that the proton has the same amount of charge as the electrons, but is opposite in sign.

In normal molecules of air there are as many electrons in the orbit of an atom as there are protons in the nucleus, and as a consequence, the total number of negative charges just balance the total number of positive charges, with the effect that the net polarity of the atom is neutral.

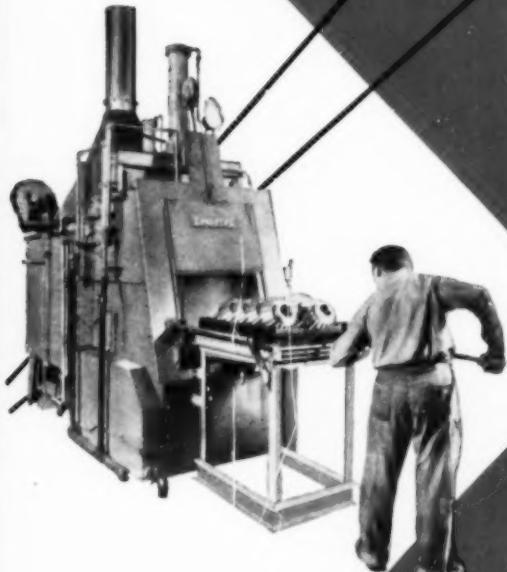
This neutrality, however, may be upset by the atom gaining or losing one or more electrons. When a preponderance of electrons exists, the atom of necessity becomes negatively charged and is generally referred to as a negatively charged ion. The term "ion" means that the particle in question possesses an electrical charge of definite polarity. Conversely, if the number of protons exceeds the number of electrons, then the atom will possess a positive charge, or we may say it has become positively ionized.

The normal number of both electrons and protons present in an atom depends upon the element in question, and is equal to what is known as the "atomic number" of the element, which corresponds to its place in the periodic table.

5

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in the effectiveness of dust removal. As a matter of fact, new test procedures have been developed which evaluate its dust arrestance based on the discoloration principle. Electronic filters today give discoloration efficiencies of the order of 85 to 90 per cent, as compared to 20 to 30 per cent for the better types of standard mechanical filters. Many applications, however, do not warrant the high order of efficiencies obtained with an electronic filter, and for installations of this type a mechanical filter generally makes a more economical investment.

In discussing the action of an electrostatic filter, the phenomena may be divided into three phases:

1. The behavior of the free electrons
2. The process of ionizing the dust particles
3. The precipitation or collection of these dust particles

The conventional ventilation-type electronic filter as it is known today may be thought of as being divided into two pieces of equipment. The air first enters the ionizer portion of the unit where the particles of dust are given an electrical charge, and these ionized particles then proceed to the collecting portion where the dust is precipitated from the air-stream. This type of unit should not be confused with the Cottrell precipitator, which ionizes and precipitates the dust in one and the same chamber. The voltages used in the Cottrell unit are of a much higher order, and the quantity of ozone produced is generally greater than in an electronic air filter.

Fig. 1 is a photograph of a typical ionizer showing the small tungsten wires which are energized with a positive potential of approximately 13,000 volts direct current. These wires are equi-spaced



FIG. 1. Typical ionizer showing relative position of charged ionizer wires and grounded struts.

between grounded struts spaced approximately three inches on center. These struts may be flat, round or

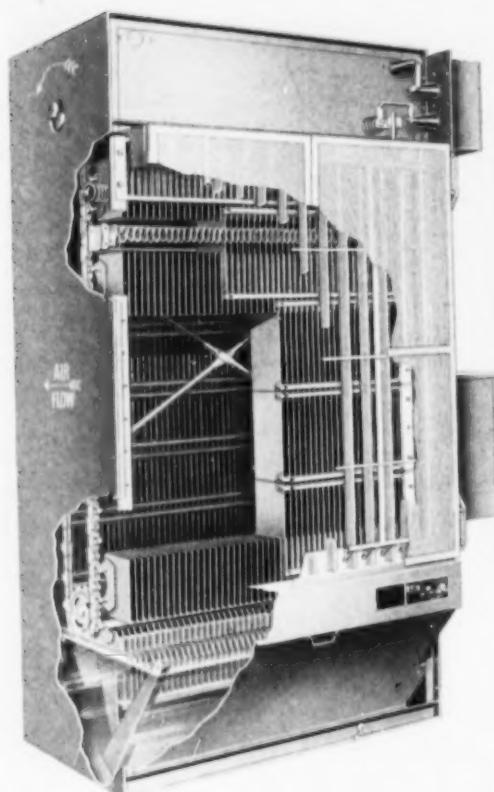


FIG. 2. Partial section of self-cleaning electrostatic air cleaner. Unit provides a double pass collecting cell as the plates at the front and at the rear of the travelling curtain are alternately charged and grounded and all are effective in the removal of dust.

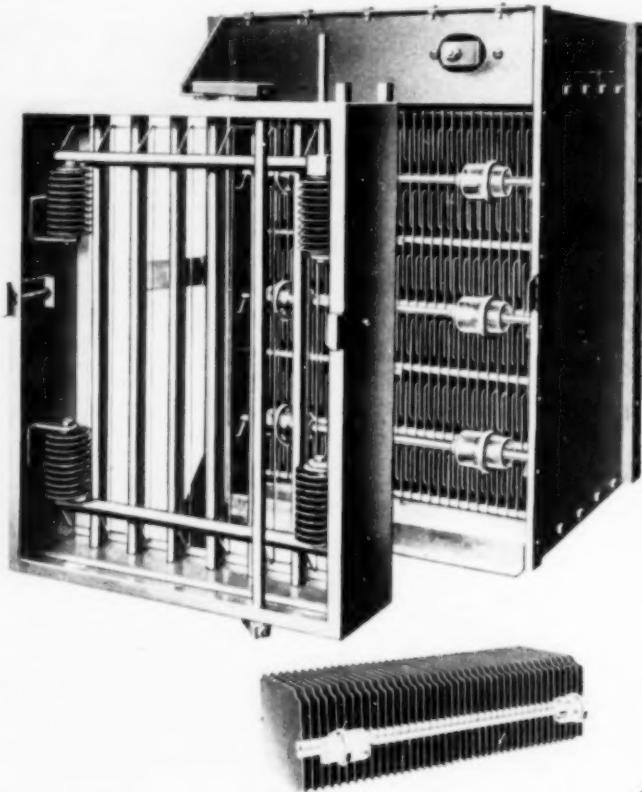
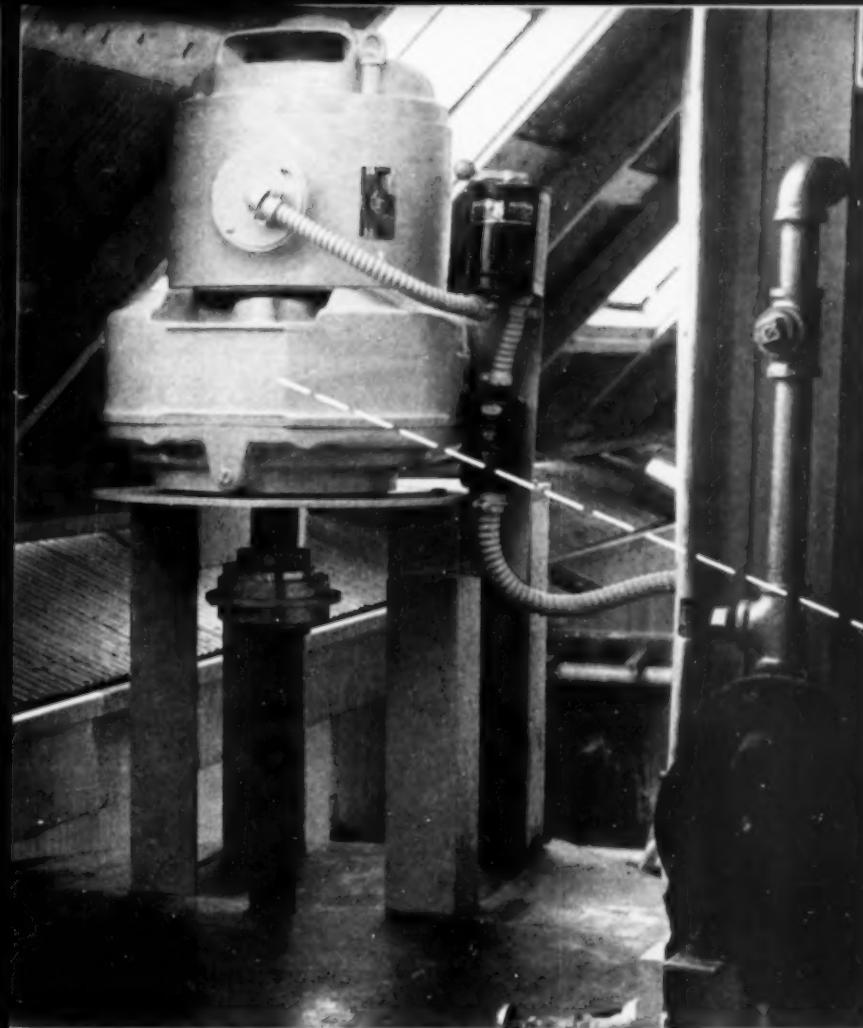
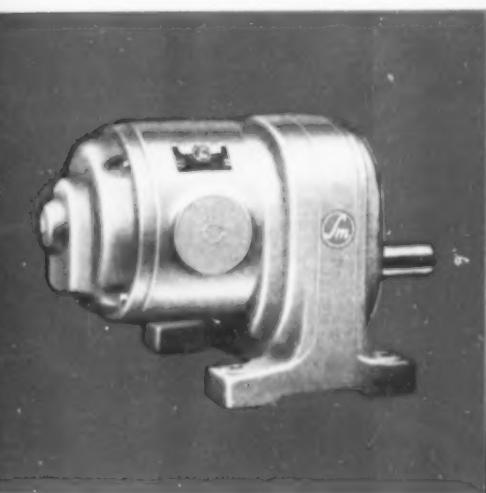


FIG. 3. Stationary plate type electrostatic air cleaner employing removable plate assemblies. Unit lends itself to a thorough periodic cleaning with a minimum of labor. It is adaptable to small installations where the additional cost of self-cleaning features may not be warranted.



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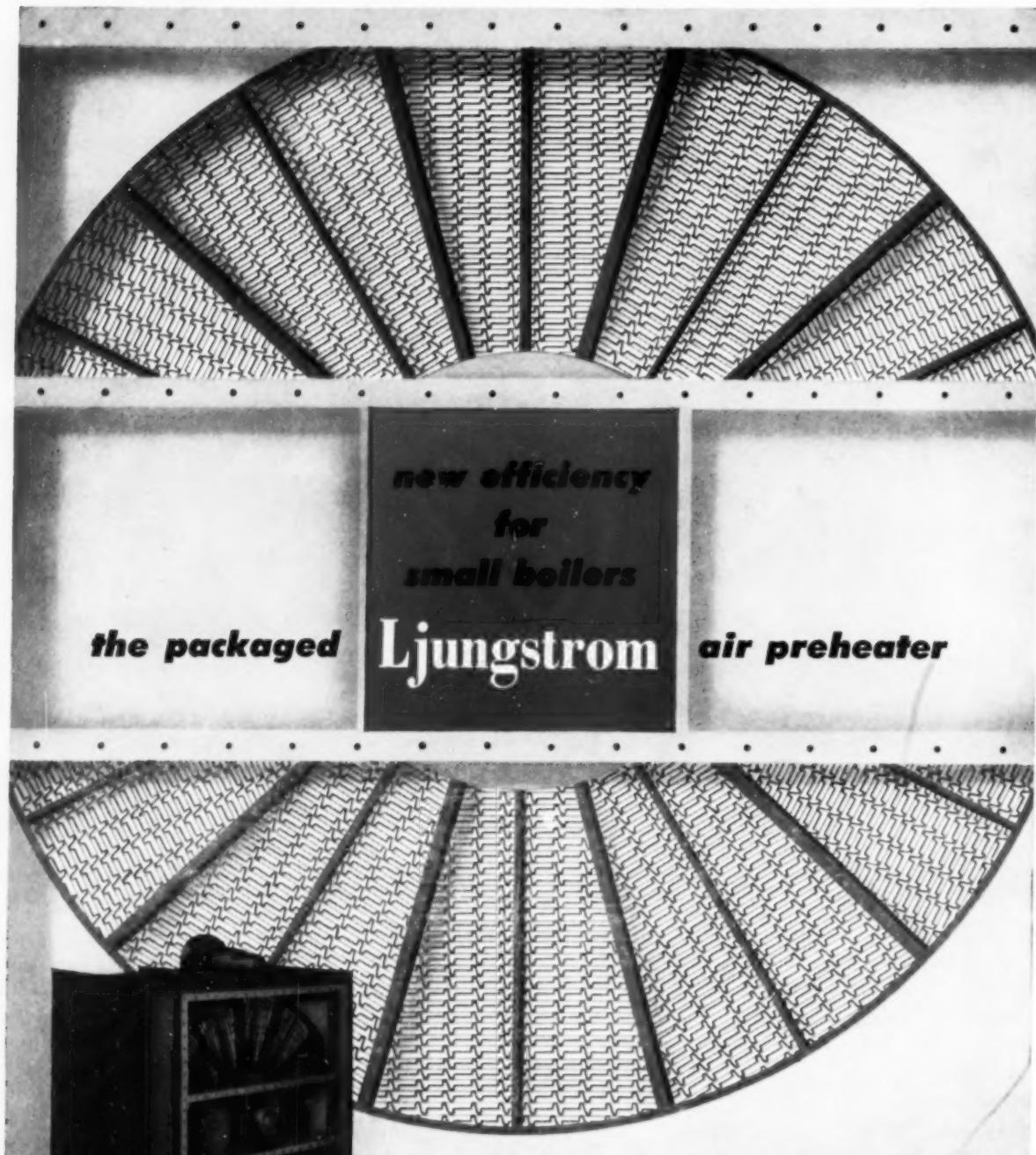
There Is a Sterling Electric Power Drive to Meet Virtually Every Requirement
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The Air Preheater Corporation 60 East 42nd Street, New York 17, N. Y.

How Electrostatic Filters Work (Continued)

streamline in shape. A strong electrostatic field is set up between the charged wires and the grounded struts with the maximum field intensity being produced adjacent to the charged wires.

Assume that a quantity of dust laden air is introduced into this electrostatic field. In this or any other air-stream there will always be present a number of free or unattached electrons. The presence of these free electrons is due to such natural phenomena as ultraviolet light, cosmic rays, radio-active materials, thermionic action, etc., and as a consequence there is a perpetual supply, so to speak, of free electrons and molecular ions from which to draw. It is the behavior of these free electrons as they enter the electrostatic field of the ionizer which constitutes the first phase of electronic cleaning.

Phase 1—Behavior of The Free Electrons

When these free electrons, which, it is recalled, are fundamental negative charges of electricity, enter the electrostatic field, they are immediately attracted to the charged wires, because there is a mutual attraction between unlike polarities.

During the process of travelling to the wire, these electrons are tremendously accelerated because the field intensity increases as the electrons approach the wires. In fact, their velocity may reach a value of 4000 miles a second, or higher. Although the path of travel may be relatively short, these electrons possess sufficient energy so that in colliding with a molecule of air they are able to dislodge an orbit electron from this air molecule, thus forming a positive molecular ion.

These free electrons may have sufficient energy to produce several positively charged molecular ions during their course of travel to the charged wires. In addition, those electrons liberated by this bombardment may in themselves possess sufficient energy to produce other molecular ions, as they in turn bombard other molecules of air.

The process, therefore, is a cumulative one, with vast numbers of positive molecular ions being produced. The electrons thus liberated

are, for the most part, attracted to the wires and absorbed, but a few stray electrons, having spent their energy, may unite with an atom of oxygen, which in turn produces a negative molecular ion. Ordinarily the vast majority of the molecular ions will have the same polarity as that of the potential supplied to the wires.

Phase 2—Process of Ionizing Dust Particles

Phase (2) of this phenomenon is next in order. Consider first the action of these newly formed positive molecular ions. Their polarity is the same as that of the charged ionizer wire and since like polarities repel, they are immediately driven toward the grounded struts. This space between the wires and the struts is sometimes referred to as the "transport zone," and during the passage of the myriad of ions toward the struts, they collide with the dust particles and in so doing give to the dust particle the same polarity as the ion had originally.

It should be remembered that vast quantities of these molecular ions are produced and there is therefore little opportunity for a particle of dust to escape contacting one or more of these molecular ions in passing through the electrostatic field. Other forces such as mass attraction, etc., are also at work and contribute in producing these collisions.

Phase 3—Collection of Dust Particles

Ionized particles of dust predominantly of positive polarity now leave the ionizer and enter the collecting portion of the unit. This constitutes the third phase of the operation. In the conventional type of electrostatic filter the collecting portion is made up of parallel metal plates, spaced approximately 5/16 in. on centers, and with these plates alternately grounded and charged with a positive potential of roughly 6,000 volts d-c. An electrostatic field is therefore generated between each parallel plate and as the ionized particles of dust enter the field formed by these plates, the particles are repelled by the plate of like polarity and attracted by the

plates of unlike polarity. When these particles reach the metal plates they are trapped and held by the viscous coating on the plate surface.

The majority of dust particles will be ionized to the same polarity as the voltage impressed on the ionizer wire, and will therefore be attracted to the grounded plate portion of the collecting cell.

Since all electronic filters operate at a relatively high voltage, it is necessary to supply a source of high potential, direct current. This is done by the use of a power pack which comprises a transformer and rectifier. Low voltage alternating current is transformed to a higher voltage, then rectified into direct current. Power packs are rated in terms of the amount of current in milliamps to be supplied, and one or more filters may be served by one pack.

Cleaning

Unfortunately no filter has yet been developed which does not at sometime have to be cleaned or have its collecting media renewed. This is true with electrostatic precipitators in that in due course of time, depending upon the dust concentration of the air being handled, the plates must be relieved of their dust load.

Fig. 2 shows a sectional view of a self-cleaning electrostatic precipitator. In the collecting portion of this filter the charged plates are stationary and the grounded plates move on a travelling curtain and revolve through a reservoir of Viscosine on the average of once every 24 hours. In reality this provides a double pass collecting cell as the plates at the front and at the rear of the travelling curtain are alternately charged and grounded and all are effective in the removal of dust.

Experience has indicated that it is advantageous to have some mechanical action such as a form of wiper in order to thoroughly clean the collected dust from the plates of an electrostatic filter. As a consequence this unit is equipped with a set of travelling wipers which move with the revolving curtain and which shears the dust from the stationary plates and at the same time provides these plates with a fresh coating of adhesive. The



FIG. 4. Self-contained stationary plate type precipitator especially designed for the elimination of oil mist and smoke resulting from high speed cutting and grinding operations.

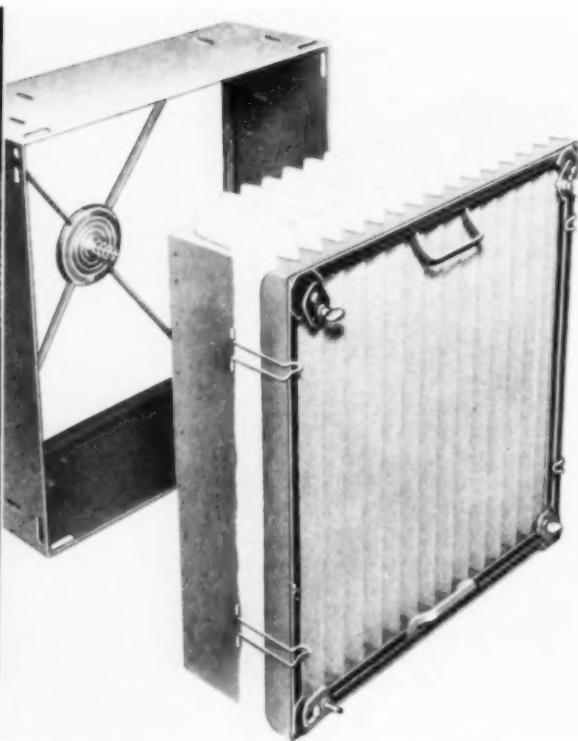


FIG. 5. Media type electronic air filter and holding frame will provide a high order of cleaning efficiency even if it should be electrically de-energized.

Illustrations courtesy American Air Filter Company.

grounded travelling plates are cleaned by a stationary wiper located in the Viscosine reservoir and the dirt which is dislodged by these wipers settles to the bottom of the reservoir and is periodically removed in the form of sludge.

Unless a filter with automatic cleaning facilities is used, it becomes periodically necessary to clean the filter by washing the plates with hot water under pressure. After washing, the plates should be dried and a coating of oil applied. This means that conventional installations of a non-automatic type of electric filter must have service facilities available for the cleaning process and a sewer connection must be provided for carrying off the contaminated water. Although plate type filters lend themselves to this method of cleaning, in some types of atmosphere it will be found that a tarry residue will remain on the plates which is very difficult to remove by any spray washing process, and in due course of time it is generally necessary to dismantle the unit and

thoroughly clean the individual plates.

Fig. 3 is a sectional type of stationary plate type electrostatic precipitator which lends itself to a thorough periodic cleaning with a minimum of labor and which is especially adaptable to small installations where the additional cost of self-cleaning features may not be warranted.

In practice this unit may be washed, dried and reoiled as is the conventional procedure for maintaining this type of equipment. However, if a build-up of dirt occurred at any point which becomes impervious to the action of the water sprays, the plate assemblies can be easily removed as positive and negative units and given a thorough cleaning. This remote cleaning is accomplished by placing the plate assembly in a specially designed cleaning tank equipped with wiper fingers which pass between each parallel plate and thoroughly scrub the surfaces. This maintenance procedure is especially applicable to small installations

where washing in place may not be practical.

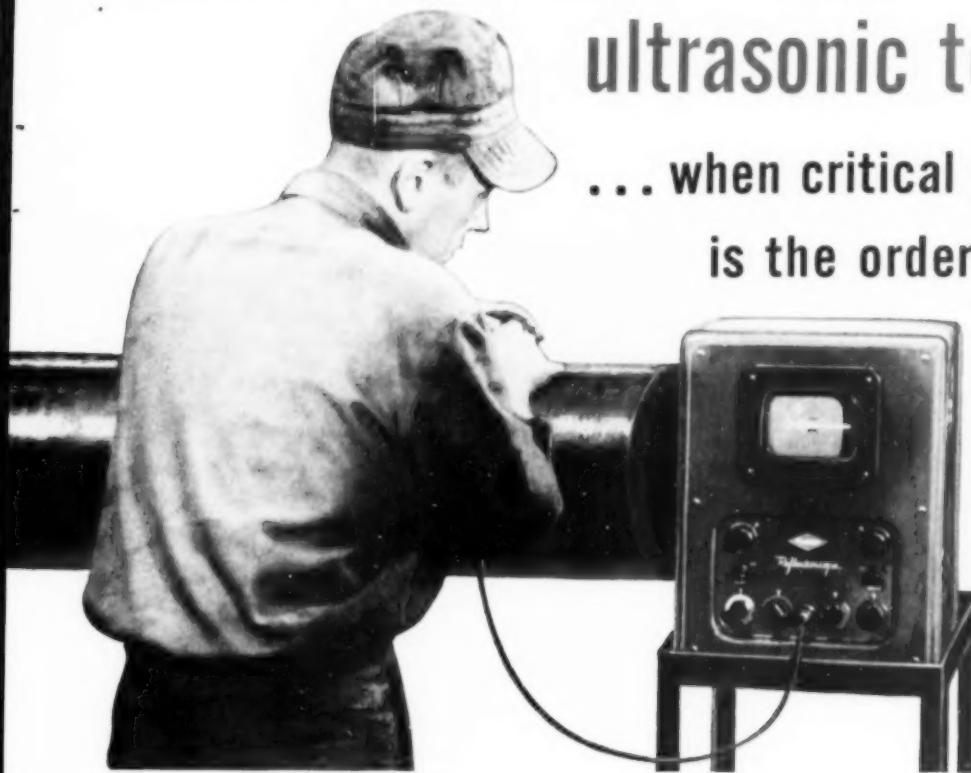
This type of design is frequently supplied with a swinging ionizer, so that where filter banks of more than one unit wide are installed the ionizer may be swung out of position so as to provide easy access to the plate assemblies. For those installations where it is desirable to clean the filter in place, the use of a swinging ionizer removes most of the obstructions to the water sprays so that no hidden areas exist, thereby contributing to a more effective cleaning operation.

This unit type construction has another interesting aspect in that when a filter ten or twelve feet high is desired, this height is secured by simply adding the individual sections as required. Because of this construction, filter heights in increments of nine inches may be secured, and this feature lends itself to a close specification of filter area for a given air volume.

Stationary plate electrostatic air cleaners have been incorporated in a complete self-contained unit as

Consider the basic advantage of ultrasonic testing

... when critical piping
is the order!



Experienced power engineers have for years been aware that alloy power piping is subject to defects which can not be revealed by conventional inspection methods. But to radiograph whole lengths of piping would be prohibitively expensive.

As a result there were occasional failures. Subsequent investigations showed that internal cracks rather than improperly welded joints were usually the cause of rupture. Such flaws would not be detected by any normal inspection methods.

To meet this problem, Kellogg, in collaboration with a large user of this class of material made investigations of inexpensive, non-destructive testing techniques which would reveal indications of hidden flaws. This program resulted in the introduction of commercial ultrasonic testing of alloy piping.

Today Kellogg uses the method extensively on high-temperature, high-pressure power piping before it is fabricated in the shops. As a successful and low cost method of putting a finger on possible injurious defects with startling accuracy, its usefulness is well documented. In view of the steadily increasing temperatures and pressures demanded by the economics of modern power generation, the value of this development is obvious.

This approach to the problems of fabricating the highest quality power piping—the willingness to explore new techniques, develop new methods—is basic to Kellogg's operation. Many power station designers and utility companies also say it's the basic reason why they repeatedly specify "critical piping by Kellogg".

These leading companies
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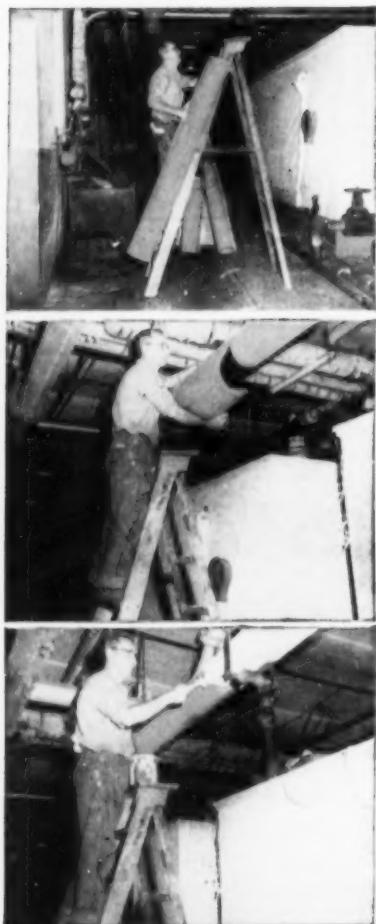
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"That new snap-on pipe insulation" that's causing so much comment in industry is G-B ULTRAFINE PIPE INSULATION. It's the first and **ONLY** one-piece molded pipe insulation of fine glass fibers piping, for plant maintenance or new construction.

To the many advantages you see illustrated below, G-B ULTRAFINE PIPE INSULATION costs no more and users report APPLICATION SAVINGS UP TO



ONE MAN takes to PIPE INSULATION weighs just harm doing it — for resilient,

A "SNAP" single section PIPE INSULATION the pipe! required. When cut this obstructive

EASY TO tightly wrap — then press or finish a of the finished job is so superior that you get the same "heat saving" with less wall thickness!

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Filters (Continued)

shown in Fig. 4 and which is especially designed for the elimination of oil mist and smoke resulting from high speed cutting and grinding operations. These contaminations have become a serious problem in many manufacturing plants where a number of machine tools and other equipment requiring coolant are in operation. In addition to the electrostatic air cleaner, this

WAY

PAGE

upon the dry filtering media. The cell is of serrated construction with the top and bottom portions of each serration made of metal, thoroughly grounded, and the intervening portion of each section is an insulated grid having high dielectric properties. A serrated type of construction is followed in order to provide a high order of media area so that the resistance offered to the flow of air will be minimized and a long media life can be expected. An elec-

(Continued on page 106)

IVY GES

In the next 4 years...

? return lines



Or like this?

For four years safety Relia 35 and
untreated condensate lines in the
plant were severely damaged by
corrosion and plugging.

or condensate return lines
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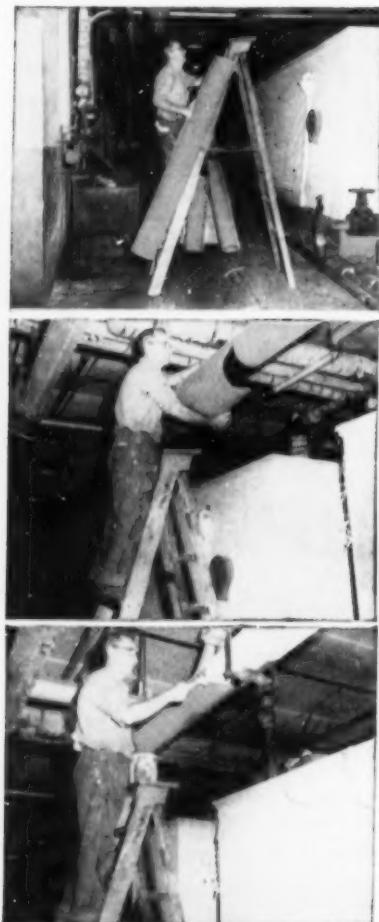
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SYSTEM...
SERVING INDUSTRY THROUGH
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"That new snap-on pipe insulation" that's causing so much comment in industry is G-B ULTRAFINE PIPE INSULATION. It's the first and **ONLY** one-piece molded pipe insulation of fine glass fibers—ideal for hot or cold piping, for plant maintenance or new construction.

To the many advantages you see illustrated below, you can add **ECONOMY**. G-B ULTRAFINE PIPE INSULATION costs no more than other insulations, and users report **APPLICATION SAVINGS UP TO 50%**!



ONE MAN, ONE HAND—that's all it takes to handle new G-B ULTRAFINE PIPE INSULATION. (This 6-foot section weighs just a shade over 2 lbs.!) No harm done if the workman should drop it—for this insulation is flexible and resilient, won't break or crumble.

A "SNAP" TO APPLY—simply pull the single seam apart, and G-B ULTRAFINE PIPE INSULATION snaps itself around the pipe! No special tools or skills required. With any knife, you can readily cut this new insulation to go around obstructions.

EASY TO FINISH—simply close seam tightly with any standard type fastener—then paint . . . leave "as is" . . . or finish as desired. Thermal efficiency of the finished job is so superior that you get the same "heat saving" with less wall thickness!

For samples and complete information, write today!

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Filters (Continued)

shown in Fig. 4 and which is especially designed for the elimination of oil mist and smoke resulting from high speed cutting and grinding operations. These contaminations have become a serious problem in many manufacturing plants where a number of machine tools and other equipment requiring coolant are in operation. In addition to the electrostatic air cleaner, this type collector also includes a heavy duty industrial type pre-cleaner which removes any metallic or abrasive dusts. Its design affords complete accessibility to all component parts which are readily removable from the cabinet without tools of any kind. A centrifugal fan mounted in the top of the unit provides the necessary circulation of air.

Media Type Electronic

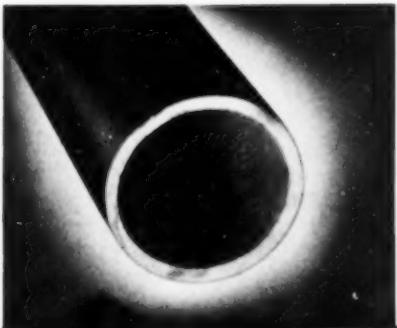
Considerable research has been in progress during the last few years in an effort to develop an electronic filter employing a dry type of collecting media. It was felt that a filter of this type would possess some very desirable characteristics in that it would embody mechanical filtration with electrostatic precipitation. Such a combination would provide a high order of mechanical cleaning efficiency in the event of power failure and would make available a new maintenance procedure where the use of wash water and the application of an adhesive would not be required. This research has resulted in the introduction of the media type electronic filter as shown in Fig. 5.

This filter is generally supplied without an ionizer and an electrostatic charge is impressed directly upon the dry filtering media. The cell is of serrated construction with the top and bottom portions of each serration made of metal, thoroughly grounded, and the intervening portion of each section is an insulated grid having high dielectric properties. A serrated type of construction is followed in order to provide a high order of media area so that the resistance offered to the flow of air will be minimized and a long media life can be expected. An elec-

(Continued on page 106)

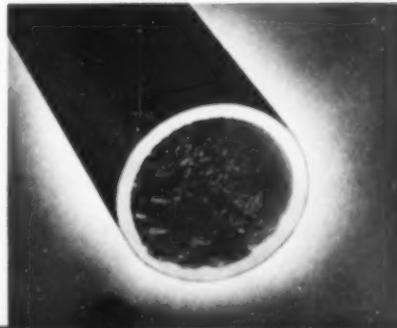
In the next 4 years...

Will your condensate return lines



Look like this...

Section of condensate line, removed after four years of plant service, shows excellent corrosion protection obtained with Nitro 35.



...Or like this?

In the four years Nitro 35 was used, untreated condensate lines in this same plant were severely damaged by corrosion and pitting.

See next page for data on how to keep your condensate return lines clean and corrosion-free... permanently.



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Send me:

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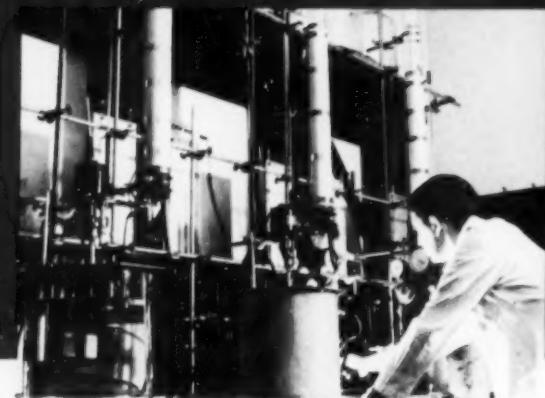
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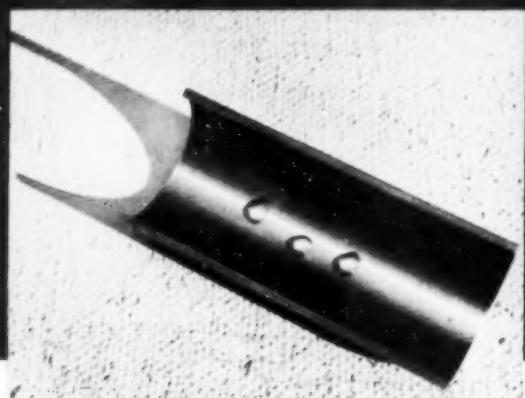
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TWO *Nalco* METHODS FOR POSITIVE CONDENSATE CORROSION PREVENTION



Continuous corrosion-prevention research in Nalco Laboratories has developed outstanding control methods and chemicals for many types of corrosion problems.



Treated with film-forming Nalco 35-FM, this section of condensate pipe shows complete repellence to water droplets. Corrosive condensate never touches metal.

Nalco 35 PREVENTS CORROSION BY pH CONTROL

Nalco 35 controls pH in the condensate return system . . . neutralizes carbon dioxide to assure corrosion prevention. Especially recommended for low make-up systems, Nalco 35 vaporizes and condenses with the steam, and at the same rate. Uniform treatment concentration is assured throughout the system; and long-lasting Nalco 35 makes positive return-line, tank, and valve protection a real operating economy.

Nalco 35 FM PREVENTS CORROSION BY PROTECTIVE FILM

Nalco 35 FM protects metals in steam systems by forming a tough, rustproof microscopic film on all exposed surfaces. Corrosive gases and liquids cannot reach the metal surface to cause damage.

Nalco 35 FM is fed with a low-cost Nalco condenser-feeder, or any good chemical pump, directly into steam or condensate lines. Once your steam system has protection of Nalco 35 FM film, low dosages maintain film permanently.

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Use the postpaid return card to get your copies of up-to-the-minute literature on condensate corrosion control listed on the reverse side of the card.

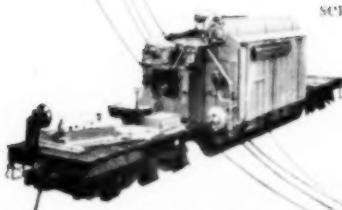


Who's buying VP boilers?

A quick perusal of the list below indicates that, varietywise, almost everyone is. Big companies and small companies representing many industries . . . chemical, paper, textile, petroleum, foods, metals, etc. — utilities, hospitals — even the Atomic Energy Commission — have purchased one or more C-E Package Boilers, Type VP.

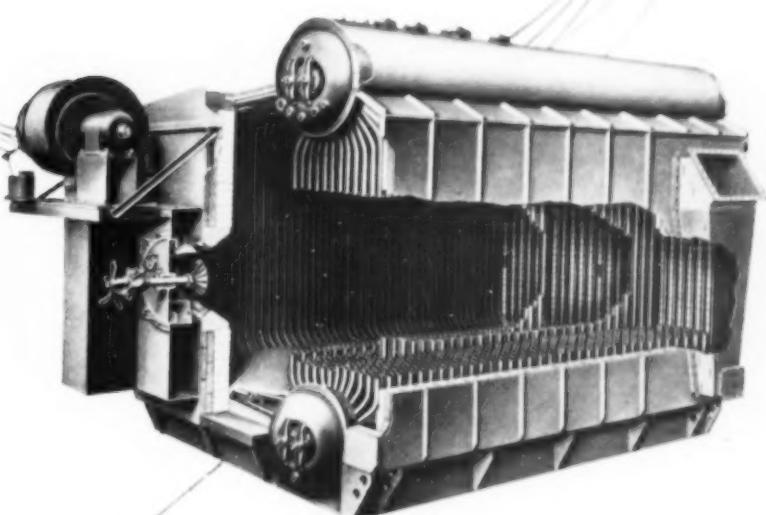
There's significance in that fact for you. It's quite likely that all of these buyers knew that there are many "package" boilers on the market. They probably knew, too, that most of them *look* pretty much alike. But they *bought* the VP — the package boiler with *extra* features. Could be that they liked the idea, too, of buying a *small* boiler from the same company that has designed and built many of the *largest* boilers in the world.

Why not look into this VP Boiler and its *extra* features? Let us send you Catalog VP 233 which describes it in detail. B-7128



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Gaylord Container Corp.
General Motors Interamerica Corp.
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Liquid Carbonic Corp.
Marinette Paper Co.
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New York Life Insurance Co.
Omaha Public Power District
Orangeburg Manufacturing Co.
Pan American Refining Corp.
Penco Hospital Center
Smith, Inc., J. Howard
Southern Cotton Oil Co.
Standard Oil Co. of British Columbia
Sure-Sol Corp., The
U. S. Atomic Energy Commission
Waterfalls Tissue Corp.
Whitaker Cable Corp.



SPECIFICATIONS — VP BOILER

Capacity . . . 4,000 to 30,000 pounds of steam per hour
Pressures . . . Up to 250 pounds per square inch
Temperature . . . No superheat
Fuel . . . Oil or gas
Erection . . . Completely shop-assembled
Foundation . . . Simple concrete slab



COMBUSTION ENGINEERING

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.

BOILERS, FUEL BURNING AND RELATED EQUIPMENT; PULVERIZERS, AIR SEPARATORS AND FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

Increased efficiency; reduced vehicle mileage . .

Two-Way Radio for Industrial Trucks

Substantial savings reported; use expanded in Texas plant.

TWO-WAY RADIO for dispatching non-scheduled operations of lift trucks, tow cars and cranes, was put into operation at Consolidated Vultee Aircraft Corp., Fort Worth, Texas, in August, 1951, on an experimental basis to determine if a substantial saving could be made.

These tests indicated the possibility of saving approximately \$30,000 a year in the Traffic De-

partment alone through increased efficiency and reduced vehicle mileage. Experience since that time has proved this estimate to be realistic and the use of two-way radio has been expanded to other operations.

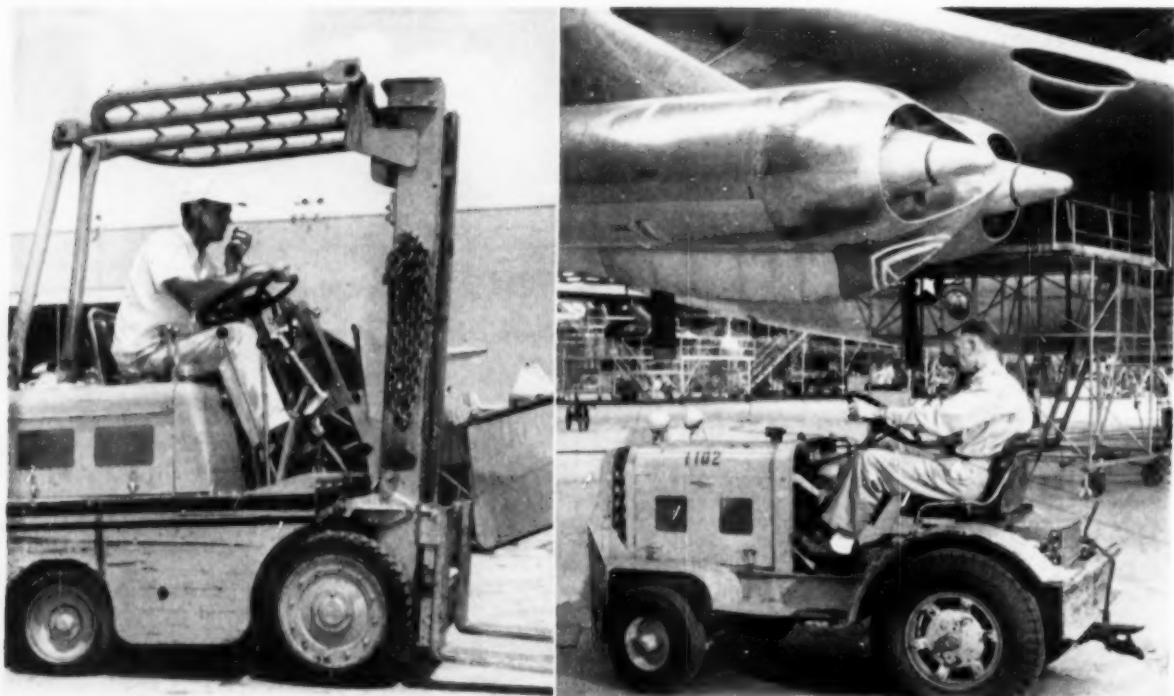
While most of the traffic operations in the plant are carried on a scheduled basis there is a great deal of miscellaneous hauling and servicing for which vehicles must be dispatched. This includes fork

trucks, shop mules and truck cranes. The Traffic Department operates some 375 powered vehicles and to date 15 of these, devoted to non-scheduled operations, have been equipped with two-way radios.

A master console is installed at the central traffic dispatcher's desk and the results in saving both time for the vehicles themselves and for

(Continued on page 92)

TRUCK OPERATOR can call for a new work assignment immediately after completion of a previous one, eliminating the time and mileage necessary to return to the central dispatcher. Convair found that two-way radio works equally as well indoors and outdoors with practically no blind spots anywhere on the premises, despite the fact that most of the buildings are both steel frame and completely sheathed in steel paneling.



Is this your TRAPPING PROBLEM?

To save steam and fuel
by using the sensible
heat of waste condensate?

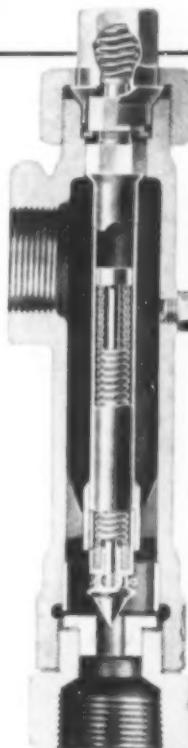
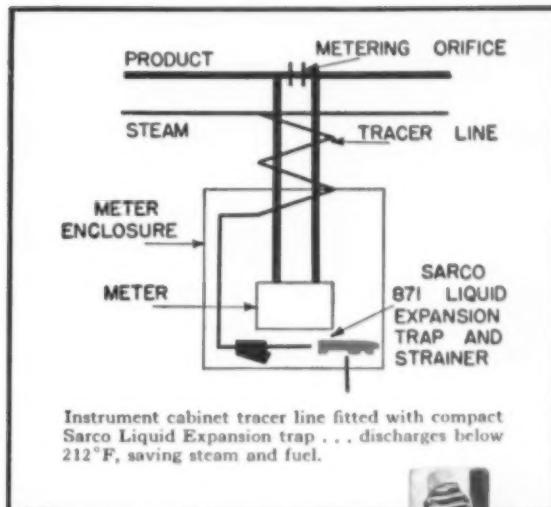
... how to be sure you select the right trap!

IT ALL DEPENDS on what you want in a trap . . . what you expect it to do. For example, if your equipment can effectively use the sensible heat of waste condensate—as in heating an outside instrument cabinet installation—then here's the right trap for you. It discharges condensate below 212°F.

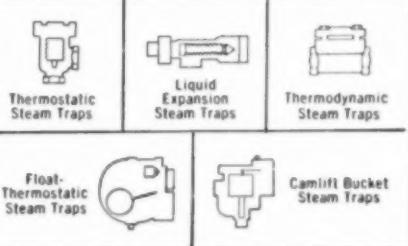
The Sarco Liquid Expansion Trap, one of the five types Sarco makes to

meet industry's trapping needs, has the following characteristics:

1. Discharges condensate at adjustable temperatures *below* 212°F thus saving steam and fuel.
2. Not affected by freezing weather, water-hammer, vibration, pressure pulsations, or superheat.
3. Compact: for example, $\frac{3}{4}$ " size is only $8\frac{1}{8}$ " long.



Only Sarco Makes All 5 Types
That's why Sarco can give impartial advice on proper trap selection!



HELPFUL BULLETIN:

For pertinent information on trap characteristics and selection, write for Bulletin 145, "Selecting The Right TYPE Steam Trap."

ENGINEERING SERVICE:

You can count on getting unbiased advice from Sarco engineers. Next time you need help on your trapping problems, call your local Sarco representative or write Sarco Company, Inc., Empire State Building, N. Y. 1, N. Y. Representatives in principal cities.

SARCO LIQUID EXPANSION THERMOSTATIC STEAM TRAP

Sizes $\frac{1}{2}$ " to 2", pressures to 450 psi. Write today for Bulletin 260.

SARCO

*improves product
quality and output*

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

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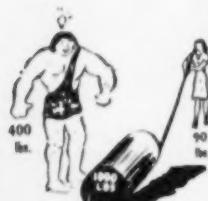
PHYSICS . . In one easy lesson or why LEVERAGE is a good invention

Reprinted from the No. 3, 1948, issue of
the Armstrong Trap Magazine

The Fairy Story



1. All Brown . . . No Brains



2. Science to the Rescue



3. Stupidity Triumphant

Size for Size, Armstrongs have greater capacity because the correct application of high leverage permits the full opening of a large orifice!

No Leverage

To open a 1-1/16" orifice at 15 psi, a steam trap without leverage would require a bucket weighing 19-1/2 lbs. and displacing 29-1/4 lbs. of water. A trap big enough to hold this bucket would weigh somewhere near 300 lbs. At 250 psi, the largest orifice this trap could open would be 9/32".

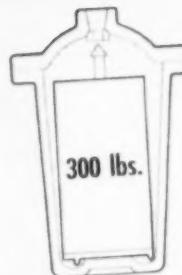
Correct Leverage

Contrast the No-Lever Trap with an Armstrong No. 216 weighing about 1/4 as much . . . 80 lbs. It also opens a 1-1/16" orifice at 15 psi and will open a 3/8" orifice wide at 250 psi — nearly 80% greater than that of the No-Lever Trap. Result of CORRECT LEVERAGE: less weight, less radiation, lower price, trap, less installation cost, greater capacity.

Too Much Leverage

Here's an 80 lb. trap with leverage double that of the No. 216 Armstrong described above. It will open an appreciably larger orifice at any given pressure than the standard Armstrong No. 216. But, it won't open the valve wide! There isn't room to get the valve completely away from its seat. Flow through the orifice is thereby restricted and capacity is reduced below that of the No. 216. The larger orifice and the greater leverage is a total loss! To get the valve wide open would require a bigger trap.

The Real Thing



Get Results . . . But Impractical



Efficiency, Economy



Misapplied Science

A BURLY giant, whom we shall call Dullbottom for lack of a more descriptive name, was amusing himself in the Petrified Forest one warm July afternoon. Entranced by the many colorful and giant-sized playthings there, he was happily engaged in rolling petrified logs down a small incline when one toppled onto his toe. Despite his most persistent efforts he was unable to dislodge this log, later calculated by Unimpeachable Authorities to weigh 1,000 lbs.

Dullbottom's gruntings and groanings attracted a petite and pretty Physics teacher who (fortunately for our story) was strolling in the vicinity. It took her but a glance to grasp the situation and, without hesitation, she obtained a crowbar from a convenient source of supply, applied LEVERAGE to the log and freed the giant's giant toe.

Completely befuddled by the powers of his 90 lb. benefactor, but clumsily grateful, he asked to feel her muscle, a request which was instantly refused. Instead, the young lady offered to explain the fundamentals of LEVERAGE. Delighted by her explanation, that given sufficient LEVERAGE she could move any weight, Dullbottom immediately proceeded to roll a 4,000 lb. petrified log onto his other foot.

With the infinite patience acquired from dealing with adolescents in the classroom, our pretty Miss obligingly procured another crowbar four times as long as the first and proceeded to move the weight—BUT, much to the dismay of Dullbottom, only 1/4 as far, which was, sad to relate, not far enough to free his toe.

And, thereby, hangs a tale. Let's use this little flight of fantasy to explain a fundamental reason why Armstrong steam traps have such large capacity for their size. Please refer to diagrams on the blackboard.

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ARMSTRONG STEAM TRAPS



HELPING the **MAN-IN-THE-PLANT**

Ideas . . Methods . . Gadgets

Stud Welded Eyebolts Solve Difficult Handling Problem in Tennessee Plant

A GOOD example of the use of stud welding to economically solve a difficult handling problem within the plant is that devised by engineers of Combustion Engineering, Inc., Chattanooga, Tenn.

In the production of automatic gas and electric hot water heaters, Combustion Engineering has to overcome the classical hurdle which faces all fabricators of galvanized tanks. The tanks must be supported in a vertical position through the various wash, pickling and galvanizing steps so as to maintain proper solution drainage in each bath. This must be accomplished

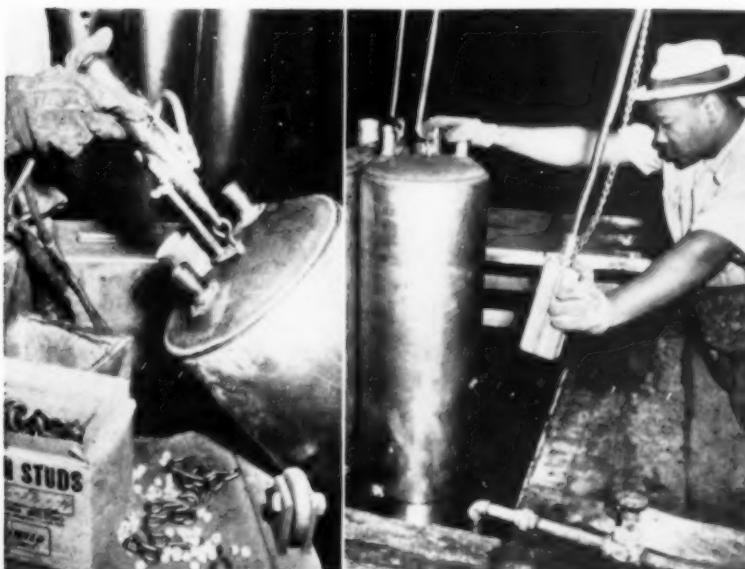
in such a way as to avoid any contacts which interfere with the processing and so produce faults or discontinuities in the final protective coating.

Formerly this was done by punching an extra hole in the tank head, hand welding a $\frac{1}{2}$ -in. pipe stud in the hole and using a special hook for a hoist hold. After galvanizing, this extra opening had to be threaded and closed with a pipe plug.

New Technique

Now all these steps are avoided by split-second end welding of a

Nelson eyebolt, stud welded to top surface of heater tank, serves to carry the tank throughout its processing cycle. At the right operator is lowering tanks into pickling bath. After tank is galvanized, eyebolt is simply snipped off with heavy-duty wire cutters.



\$\$\$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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5/16-in. dia. x 2 1/2-in. long Nelson eyebolt stud directly to the top surface of the heater tank. This eyebolt serves to carry the tank throughout its processing cycle, and after galvanizing, is simply snipped off with heavy-duty wire cutters.

As Boyd Scanland, general superintendent of Plant No. 3, says: "We use this method because it is simple and saves time. All we have to do is position the Nelson gun near the center of the tank head, pull the trigger, and it's all over."

The ultimate owner of one of the stud welded tanks, incidentally, gets a bonus, too, as the potential point of leakage represented by an unnecessary hole is eliminated.

Flat Leather Belt Drive for Press

THE Bristol Metal Products Corporation of Bristol, Tenn., found it necessary to replace a five "B" section V-belt drive for a 100 ton Wareco punch press. This was a V-flat drive with a sheave on the

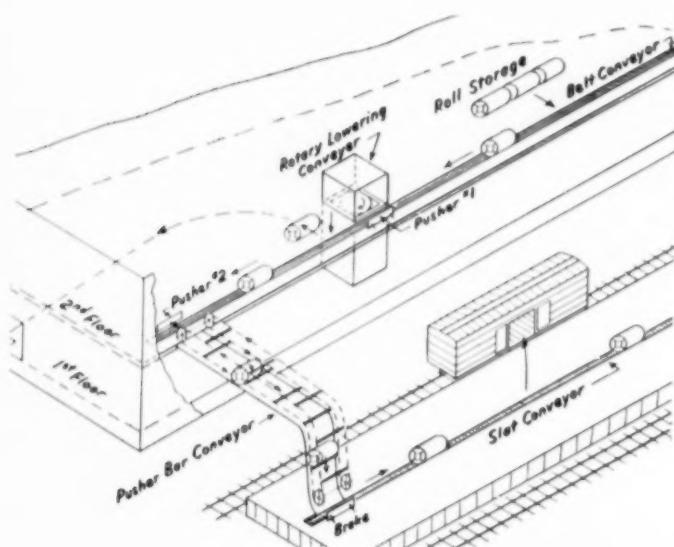
Ideas . . Methods . . Gadgets (continued)

motor and a flat faced pulley on the press.

Instead of replacing the V-belts it was decided to use a pulley on the motor and a medium double, oak tanned flat leather belt with rayon tire cord between the two outer layers of leather, which resulted in a saving of some \$175.00. With this type of construction the belt has great resistance to stretch and on this application it was not necessary to shorten it after more than a year of operation. The leather of course provides a good

grip on the pulley, and the combination with the rayon tire cord gives the belt excellent capacity to handle peaks and overloads. Splices can be prepared by the manufacturer (Chas. A. Schieren Co.) so that the belt can be made endless on the job.
—W. A. Fancher—Tenn.

On this drive the motor is 10 hp, 1160 rpm. The diameter of the motor pulley is 9" and that of the driven pulley 36", with a distance between centers of 30". The motor is not mounted on a tension control base. Performance of this drive has been satisfactory.



One Ton Rolls of Paper Moved to Shipping by Automatic System

AUTOMATIC materials handling equipment of the most modern type will move huge rolls of paper from storage to shipping at the new Bowaters Southern Paper Corporation Mill at Calhoun, Tenn.

Rolls weighing more than a ton, 6 ft long and 45 in. in diameter are stored on the second floor and will be carried automatically to railroad and truck loading docks at ground level by a new system which has been designed and will be installed by Lamson Corporation. This sys-

tem has been planned for a capacity of 1800 tons of paper during each eight hours of operation.

Rolls of paper begin their trip at the storage area on the second floor. They are loaded onto a belt conveyor located in a trench in the floor to eliminate lifting of the heavy rolls. An ingenious method has been developed to mark the belt in order to guide operators in loading it to practical capacity and identifying rail and truck shipments.

An automatic pusher moves the paper roll off the belt conveyor and onto a descending conveyor which carries it to the first floor truck dock, moves it gently out onto the floor and returns automatically for the next load. Since it is desirable to roll the paper in only one direction to avoid loosening the outer layers of the tightly wound roll, this conveyor is equipped with a device which rotates the roll 180 deg in a horizontal plane. To avoid loss of time, this rotation takes place as the roll descends to the first floor.

At another position on the belt conveyor, a second automatic pusher transfers rolls for rail shipment to a conveyor of the pusher-bar type. This conveyor transports the rolls horizontally about 40 ft and then down about 18 ft, discharging them automatically to a long troughed steel slat conveyor sunk into the shipping platform. While the pusher-bar type of conveyor is not new, it is doubtful if one has ever been built to the size and capacity of this unit. It was selected to avoid an automatic transfer from a horizontal to a descending conveyor at an inaccessible location above the railroad platform.

The slat conveyor is of exceptionally rugged construction to permit free truck movement across it and all along the platform. Safety devices are included to stop any unit in the system if the succeeding unit is not ready to receive the roll.

T F



Caps are part of the story



The announcement of the WeldELL line, back in 1931, created a considerable sensation in the piping field. Pipe welding was then just beginning to emerge from the crude, cut-fit-patch stage and the only welding fittings then in use were simply elbows.

But here was a *full line* of welding fittings—not only the long and short radius ell's, but also full branch and reducing tees, concentric and eccentric reducers, stub ends, welding neck flanges . . . even *caps*!

You know what happened: The WeldELL line had taken pipe welding out of darkness into light . . . had provided the impetus and set the pattern of modern pipe welding practice.

Yes, the WeldELL line was the first complete line—the first engineered line . . . and the fittings that showed the way are still showing the way. For up-to-the-minute facts about the WeldELL line see your Taylor Forge Distributor.

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Ideas . . Methods . . Gadgets (continued)

Harness Reduces Crate Moving Costs

HEAVY crates that are too long for one lift truck to handle can tie up loading docks and tie down manpower.

The problem becomes acute in the case of a firm like Temco Aircraft Corporation whose products require crates more than 30 ft long.

The Dallas, Texas, firm recently found an inexpensive means of moving its long crates—a system that requires only one lift truck, an operator and a unique chain harness.

J. R. Yarborough, Temco shipping inspector, designed the harness. It consists of two 8 x 8" scrap steel plates and two lengths of $\frac{3}{4}$ -link trace chain. Yarborough's harness enables the three-or-four-foot forks on a lift truck to support, lengthwise, an object many times their length.

How It Works

To move a 20 ft crate, for example, the lift truck operator runs the truck forks under one end of the crate. He then hangs the steel

plates on the upper two corners of the crate's far end.

These plates are shaped to fit crate corners, and are fitted with metal points which bite into the crate to prevent slippage. Points, welded on, are about $\frac{1}{2}$ " long.

Plates are joined with a length of chain long enough to reach across the width of the crate. A metal ring at the center of this chain connects to a long chain that is anchored on the lift truck.

After attaching the corner plates and anchoring the long chain on the lift truck, the operator tilts his fork lift until the slack harness is drawn taut. Plate points bite into the crate, the far end of the crate leaves the ground, and the load is ready to move.

On Temco's docks, the harness

Chain harness consists of two 8 x 8" scrap steel plates and two lengths of $\frac{3}{4}$ -link trace chain. Plates are shaped to fit crate corners (close-up at right) and are fitted with metal points, which bite into the crate to prevent slippage. Typical application of the chain harness is shown below.

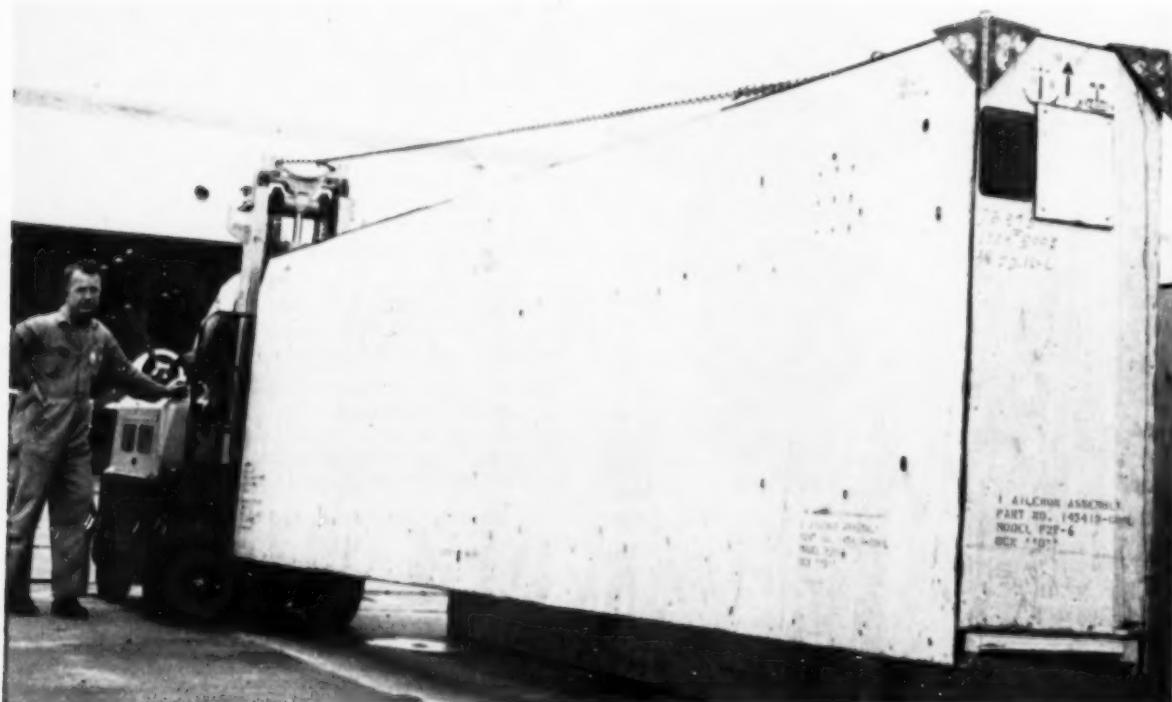
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has reduced large crate moving from a two and three-man operation to a one-man job. With the harness, too, there is less chance for damage to cargo and injury to personnel.—S. H. Carter—Tex.





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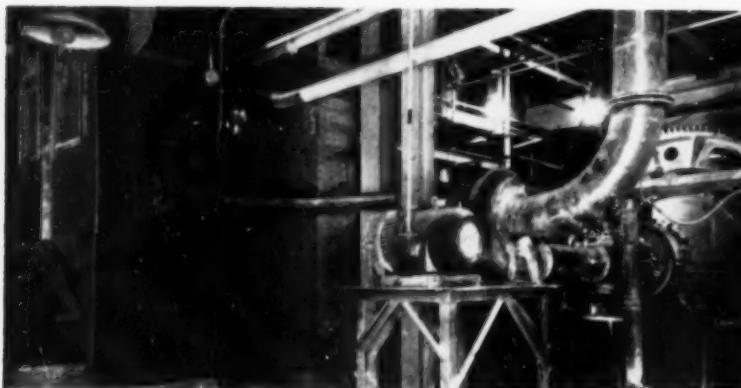
Send for our informative Brochure — The Collection and Recovery of Industrial Dusts. It explains *all three* Buell systems of industrial dust collection. Write Dpt. 80-C, today for your complimentary copy. Buell Engineering Company, 70 Pine Street, New York 5, N. Y.

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Ideas . . Methods . . Gadgets (continued)



View in the enamel grinding department at American Radiator & Standard Sanitary Corp., Louisville, Kentucky. Two-compartment continuous automatic Dustube Dust Collector, manufactured by American Wheelabrator & Equipment

Corp., is at left. Hardinge pebble mill can be seen in the background. Dustube ventilates the Hardinge pebble mill and classifier in a closed circuit air system. The fan in the foreground is for the Hardinge mill.

Cloth-Type Collectors Ventilate Grinding Operation and Reclaim Material—Kentucky

CLOTH-TYPE dust collectors are especially adaptable for ventilating operations in the grinding and classifying of enameling material. Although these operations are characterized by high temperatures, the development of synthetic fibers capable of withstanding high temperature conditions has made the use of cloth filters possible.

American Radiator & Standard Sanitary Corporation's Louisville, Kentucky, plant (producing enameled cast iron plumbing fixtures) uses an American Dustube cloth-tube-type collector (American Wheelabrator & Equipment Corp.) to ventilate a Hardinge pebble mill and classifier.

Process Data

The raw materials for the enamel are mixed and melted in a furnace, whereupon the mixture is cooled and sent to the pebble mill for grinding. The mill is ventilated by a closed air circuit system, the velocity of which is very carefully maintained so that only material which has been ground to the proper size will be removed in the air current. Material ground too finely to be used may also be carried out, but none of the enamel carried out by

the air will be of a particle size too large for use. The air current leaving the mill carries the ground enamel to the classifier (of the centrifugal type), where the material of the correct particle size is separated from that which is too small to be used in the enameling process.

The correctly sized material goes on to the application department. The fine material, rejected by the classifier, remains airborne and finds its way back to the pebble mill, since it is in a closed circuit, so to provide for the gradual elimination of fines, and also to provide a slight suction so that dusty air will not leak out into the room through joints in the duct work, 25% of the air leaving the classifier is drawn off. This air is ventilated through the Dustube Collector where the small enamel particles are trapped and reclaimed. This material can be reused, so it is put into the melting furnace and processed again. The collector, therefore, not only keeps the surrounding air from being dusty, but it also affords a monetary saving through the reclamation and reuse of otherwise waste material.

The collector is a two-compartment, continuous automatic unit.

The dust which accumulates on the tubes is dislodged by automatic mechanical shaking at regular intervals, whereupon it falls down into a hopper from where it is removed. As only one compartment shuts down for shaking at a time, continuous filtration is maintained.

Report on Oil and Gas Engine Power Costs

ASME's 37 page report covers 137 plants with 551 engines.

The 1953 Report on Oil and Gas Engine Power Costs (Data for 1952 and previous years) has been published by ASME. More engines and more total horsepower are featured than in any previous report.

Table I—Plant Cost Table—of the 37-page report, shows plant ownership, type, number of engines and total rated horsepower, total plant hours operated, total output, load factors, average cost of fuel and lubricating oil, and costs per net kWhr in mills.

The 137 plants reported break down as to ownership as follows:

Municipal power and/or water plants.....	69
Cooperative power plants.....	28
Privately-owned utility plants.....	28
Industrial power plants.....	8
Sewage disposal plants.....	8
Public power district plants.....	8

Table II of the report lists costs by years for plants reporting for successive years. It is not in as much detail as Table I, but does give installed horsepower, net output, plant load factors, average cost of fuel in cents per gallon (or Mcf for gas), and operating cost. Eighteen plants are reported for 20 successive years; 34 for ten successive years.

Table III gives detailed operating information such as type of engine, hours operated, gross output, peak load, inspections on fuel used, cooling system, cost of engine repairs, shutdowns, scheduled maintenance time, and number of plant attendants per shift.

Currently there is much interest in possibilities of burning cheaper fuel oils in engines. As an example of the utility of Table III, it is possible to correlate the engine with the load, the fuel, and the maintenance cost.

Copies of the 37 page report are available from the American Society of Mechanical Engineers, 29 West 39th St., N. Y. 18, N. Y. Price is \$2.50 per copy—\$2 for ASME members.

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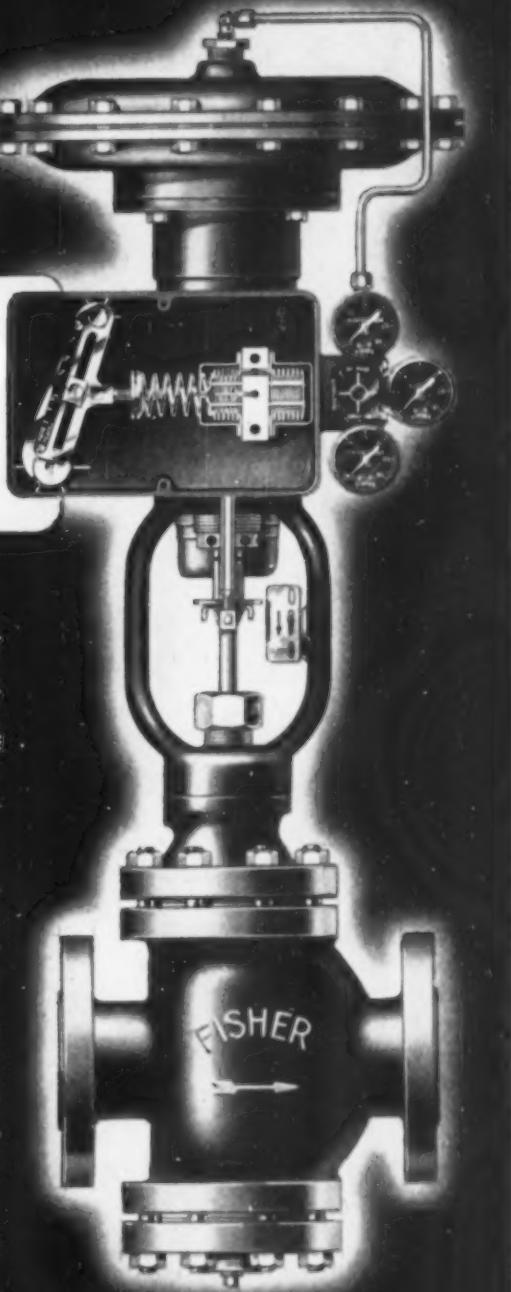
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STEM MOVEMENT SENSITIVITY AMOUNT STEM CHANGE TO PRODUCE 2 LBS. TO 15 LBS. TO DIAPHRAGM	1/2" TRAVEL	0.0037" AVE.
	2" TRAVEL	0.015" AVE.
SPEED TIME IN SECONDS FOR FULL TRAVEL	SIZE	TRAVEL
	DD	1/8"
	FF	1/2"
	GG	2"
	HH	2"
LAG ERROR IN POSITION AT 9 LBS. CONTROLLER PRESSURE	1/2" TRAVEL	0.0006" AVE.
	2" TRAVEL	0.001" AVE.
EFFECT OF VARIATIONS IN AIR SUPPLY PRESSURE	1/2" TRAVEL	0.1 LB. PER 5 LB. CHANGE
	2" TRAVEL	0.1 LB. PER 5 LB. CHANGE
CHARACTERISTICS CONTROLLED P VS DIAPHRAGM P		LINEAR
COMMENTS		STABLE ADJUSTMENTS ALL EASY AND SIMPLE
AIR CONSUMPTION NORMAL 9 LBS. DIAPHRAGM PRESSURE		15.0 CU FT/HR.

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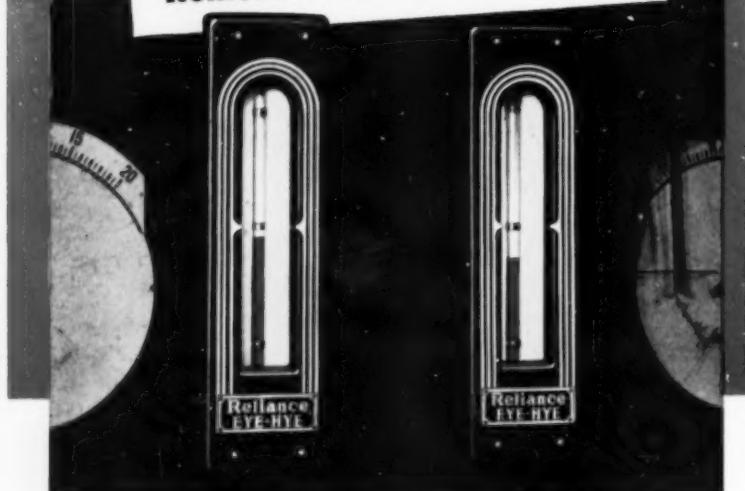
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Remote Reading Gage
All-hydrostatic • Reads like a tubular glass gage



Plastic Pipe Line

(Starts on page 50)

against extremely heavy weight loads by reinforced concrete conduit. The conduit was placed in the ditch and the Tenite pipe run through it.

The plastic pipe line will be operated at about 50 psi and is buried 30 in. below the surface of the ground. Before covering the pipe with earth the line was satisfactorily tested up to 70 psi.

The new Wilmington Steam Electric Generating Plant, where the pipe line will be used, is to be the largest in the Carolina Power and Light Company system. Two generators capable of delivering 100,000 kw each are to be installed. Plans call for completion of the first unit in 1954 and the second in 1955.

Installation was made by the Carolina Power and Light Company. Construction of the pipe line was under the supervision of Ebasco Services, Inc., Grinnell Corp., Warren, Ohio, supplied the pipe which was extruded by Busada Manufacturing Co., Maspeth, N. Y. Tenite butyrate plastic is marketed by Eastman Chemical Products, Inc., Kingsport, Tenn.

Two-Way Radio for Industrial Trucks

(Starts on page 82)

the operation being served have been extremely good. By dispatching vehicles with loads and re-routing them when they arrive at their destination, Traffic Department supervisors have been able to avoid congestion, get far more use of the equipment and save a great deal of time and money for production departments.

The results have been so good that the use of two-way radio equipment has been expanded to other departments. To date, the Industrial Security Department has eight two-way radio equipped vehicles directed from its own master control center and 8 sets together with a master are on order for the Maintenance Section field unit and four sets with a master have been ordered for the Civil Defense unit.

The Federal Communications Commission has assigned four frequencies for the use of the four units enumerated above. This, of course, is in addition to all aircraft radio communication frequencies.



Above: POWERS ACCRITEM Temperature Regulator, is water or compressed air operated. Controls FLOWRITE diaphragm valve (right). Widely used for Water Heaters and Industrial Processes.



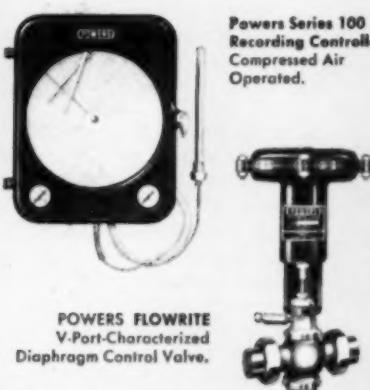
POWERS Type H Thermostatic Water Mixers insure utmost comfort and safety in showers and other types of baths.

Also used for many processes. Users report $\frac{1}{2}^{\circ}$ F. \pm accuracy. Capacities 5 to 10 gpm. @ 45 psi.



Powers No. 11 Self-Operating Regulator widely used for water storage heaters, heat exchangers, fuel oil pre-heaters and many industrial processes.

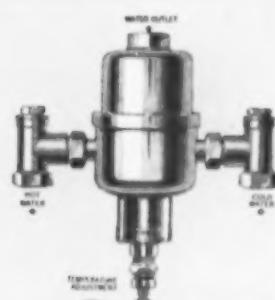
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Powers Series 100 Recording Controller. Compressed Air Operated.



POWERS FLOWRITE V-Port-Characterized Diaphragm Control Valve.



Powers Thermostatic Water Controller for regulating temperature of multiple type showers, hydro-therapy and industrial processes. Capacities 22 to 125 gpm. @ 45 psi.



Powers Remote Bulb Type D Thermostat for Unit Air Conditioners.



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Our More than 60 Years Experience will be valuable in helping you select the right control for your requirements. Contact our nearest office or Write us direct for Condensed Catalog Rb 24.



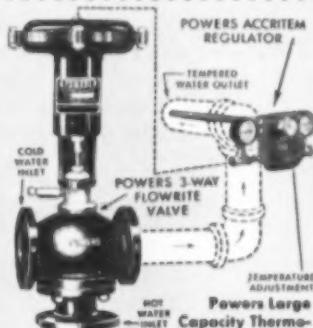
Powers MASTROL Control for regulating forced hot water heating systems.



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Mixing Valve Controlled by an ACCRITEM Temperature Regulator, Capacities 20 to 1200 gpm. @ 45 psi.



Powers Room Type Pneumatic Controls for Radiant Heating-Cooling Panels, Conectors and Unit Ventilators. Valves are packless. No more packing maintenance. No leakage.

Equipment..Supplies..Methods

Magnetic Positioning Tool

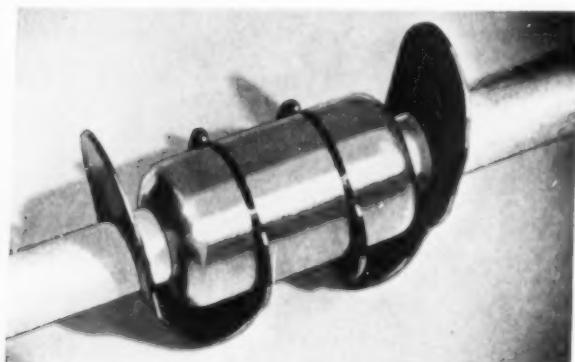
C-1 STANDARD PORTABLE CORD Co., INC., Jamestown, New York, has announced production of the "Magic Positioner" holding device which consists of three



Dual Purpose Pipe Coupling

C-3 THE MASTER ENTERPRISE CORPORATION OF AMERICA, Boulder Bldg., Tulsa, Oklahoma, announces a new coupling designed especially to ease and simplify the process of connecting tubing or pipe in any size range and for any purpose.

The Meca Coupling requires no threading, flares, ferrules, or tools of any kind to make the connection. In a matter of seconds the most in-



Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.

45 lb pull, neoprene covered, Alnico V, guaranteed permanent magnets.

The magnets are held in a die-cast, high tensile aluminum frame and have full 360° adjustment, which is regulated by a scale showing 5° gradations. When positioned, each magnet can be locked in place. This feature provides for positioning the tool to conform to almost every conceivable welding operation, and the holding of almost every shape or design of metal.

Costly fixtures for short run production are eliminated as well as 2-man maintenance, production, and welding operations.

experienced can connect the tubing or pipe into a sealed connection able to withstand extremely high pressures. Press the spring clip, insert the tube, release the spring and that's all there is to do.

One of the principles of the coupling is the grooving of the interior. At each end are grooves containing rubber O-rings or silicone or tefalon rings depending upon use. The sleeve is tapered on the inside to allow for any variation in the outside diameter of the tubing or pipe. The coupling has

Synthetic Rubber V-Belt

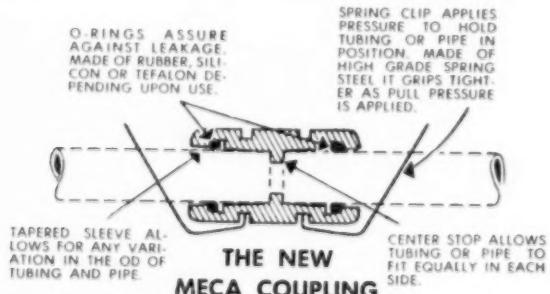
C-2 RAYBESTOS-MANHATTAN, INC., MANHATTAN RUBBER DIVISION, Passaic, N. J., has introduced an improved "super-power" V-belt.

The company states that in addition to providing 40% greater horsepower capacity on existing drives, the belt, known as the R/M Super-Power V-Belt, lasts relatively longer than standard V-belts. On new drives, narrower sheaves may be used, saving space, because fewer belts are required for the same power demands.

The new belt has practically no stretch, virtually eliminating belt matching problems.

a stop in the center that allows the insertion of tubing or pipe to fit equally in each side. The spring clip grips tighter as pull pressure is applied.

For permanent coupling or repair coupling of gas, water and oil lines, units are available in sizes to fit up to 2 in. O.D. tubing or pipe. Depending on use, coupling is available in aluminum, brass or steel. Available also as tees, elbows and connectors with a threaded end and hexagon outside for connecting into present equipment.



Coupling can be connected by an inexperienced man, without using tools, in less than 5 seconds. To insert tubing or pipe merely press the spring clips toward the center. Insert pipe or tubing in each end and release spring clip.



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**BUILT
IN**

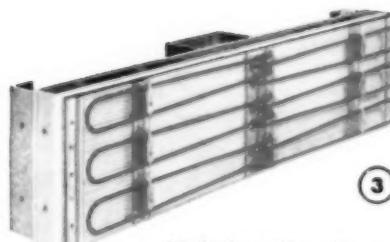
- ELEMENTS
- THERMOSTAT
- CONTROL
- SCREW-PLUG



NWH Automatic Circulation Heaters

**BUILT
IN**

- ELEMENTS
- THERMOSTAT
- HEATING CHAMBER
- INSULATION
- MOUNTING LUGS



RP Radiant Oven Panels

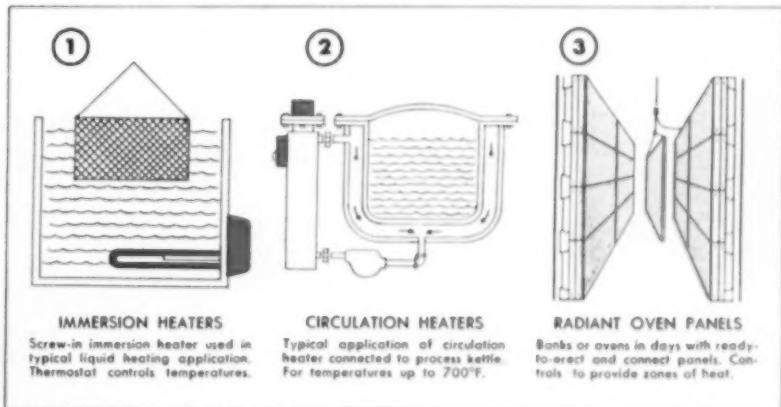
**BUILT
IN**

- STEEL FRAME
- METAL SHEATHED ELEMENTS
- REFLECTORS
- PREHEATING AIRWAYS
- INSULATION
- BUS BARS

CHROMALOX

Electric Heat for Modern Industry

DESIGNERS AND MANUFACTURERS OF ELECTRIC HEATING UNITS EXCLUSIVELY SINCE 1917



IMMERSION HEATERS
Screw-in immersion heater used in typical liquid heating application. Thermostat controls temperatures.

CIRCULATION HEATERS
Typical application of circulation heater connected to process kettle. For temperatures up to 700°F.

RADIANT OVEN PANELS
Banks or ovens in days with ready-to-erect and connect panels. Controls to provide zones of heat.

CHROMALOX **PACKAGED ELECTRIC HEATERS** are ready to go to work on the heating jobs in your plant. Easy to install, they may be used as permanent or portable heat sources to give you clean, dependable, accurately controlled heat at temperatures required. Heaters are available for degreasing, cleaning, pickling and plating; for melting greases, asphalts and similar viscous fluids; for heating air and other gases; and for preheating fuel oils and superheating steam.

Nationwide application assistance, plus immediate delivery from the world's largest stock of electric heating equipment.



**GET MORE DETAILS
SEND COUPON TODAY**

10-75

EDWIN L. WIEGAND COMPANY, Industrial Division
7563 Thomas Boulevard, Pittsburgh 8, Pa.

Please send me Chromalox Catalog 50.
 Have a Chromalox Application Engineer get in touch with me.

Name _____

Company _____

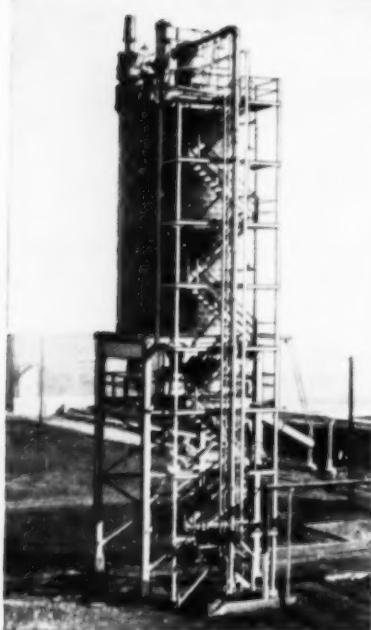
Street _____

City _____

Zone _____ State _____

C. B. Rogers and Associates, 1080 Peachtree St., N. E., Atlanta 5, Ga.; L. R. Ward Co., 5009-11 Canton St., Dallas 26, Texas; 1814 Texas Avenue, Houston 3, Texas; 1515 South Houston Ave., Tulsa 14, Okla.; Ranson, Wallace & Co., 1815 East Fourth Street, Charlotte 2, N. C.

SOUTHERN POWER & INDUSTRY for MARCH, 1954



A National Installation at the CHEMSTRAND CORPORATION in Decatur, Alabama

turn the
**EXPERIENCE
OF OTHERS
to your advantage**

Many important engineers have learned that National Ash Conveyor Systems save money. A survey of your own plant will cost you nothing but it may result in cutting your expenses as it has the plants listed.

When you install a

**NATIONAL PNEUMATIC
STEAM ASH REMOVAL
SYSTEM**

you can count on long life with minimum down time for repairs. Rugged construction, careful engineering and expert National Servicing have made strong friends of our clients.

Representative NATIONAL INSTALLATIONS:

Central State Hospital • Cluett, Peabody & Co., Inc. • Fisher Body Division, G.M.C. • Memorial Hospital • National Distillers Chemical Corp. • Naval Industrial Reserve Shipyard

Send today for informative catalog illustrating typical applications.

**NATIONAL
CONVEYORS
COMPANY, INC.**

25 INDUSTRIAL AVENUE,
FAIRVIEW, NEW JERSEY

Manufacturers of The National
ChipVeyor System For Metal Turn-
ings - Furnace Doors - Feeders - Ash
Gates and Related Equipment.

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

Wet-Dry Vacuum Cleaner

C-4 CLARKE SANDING MACHINE Co., Muskegon, Mich., has introduced three versatile cleaning units included in one basic heavy-duty industrial wet-dry vacuum cleaner.

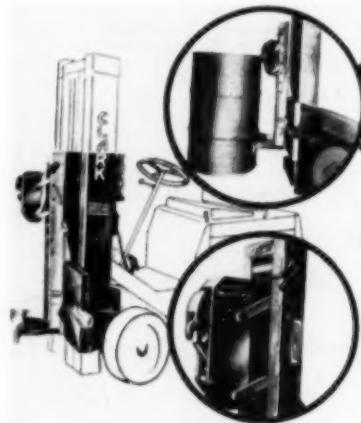
The basic unit is "Suctioneered," a term adopted to point up the fact that the machine is engineered and designed from the ground up for maximum suction power and versatility.

The 1 hp Universal Type by-pass motor may be removed easily for use as a portable vacuum to reach hard-



Heavy-duty industrial unit has wet capacity of 12 gallons and dry capacity of 1.5 bushels.

to-get-at places. The motor is useable, too, as a high-velocity blower for cleaning motors and machinery. A full line of job-designed attachments is available.



**Drum Handling Attachment
For Any Power Truck**

C-5 MARVEL INDUSTRIES, INC., 2224 Cleveland Street, Evanston, Illinois, announces the new Liftomatic Power Truck Attachment for handling drums.

Made to fit any power truck, the device can be attached or removed by one operator in just a few minutes. Any drum can be handled, fiber or steel, regardless of diameter, height or bead or rim size. The Liftomatic is mechanical and completely automatic. No additional power controls are needed, as pickup and release are effected through raising or lowering the truck cylinder. It allows transportation, tiering, and exact placement without the use of pallets or dunnage.

LOOK! **HOW
OBSERVANT
ARE
YOU?**

Find the two identical ads in this issue.
Write that company and receive a
handy usable premium.

HINT: It's hot stuff.

OBEDIENCE THE LAW and pocket the difference

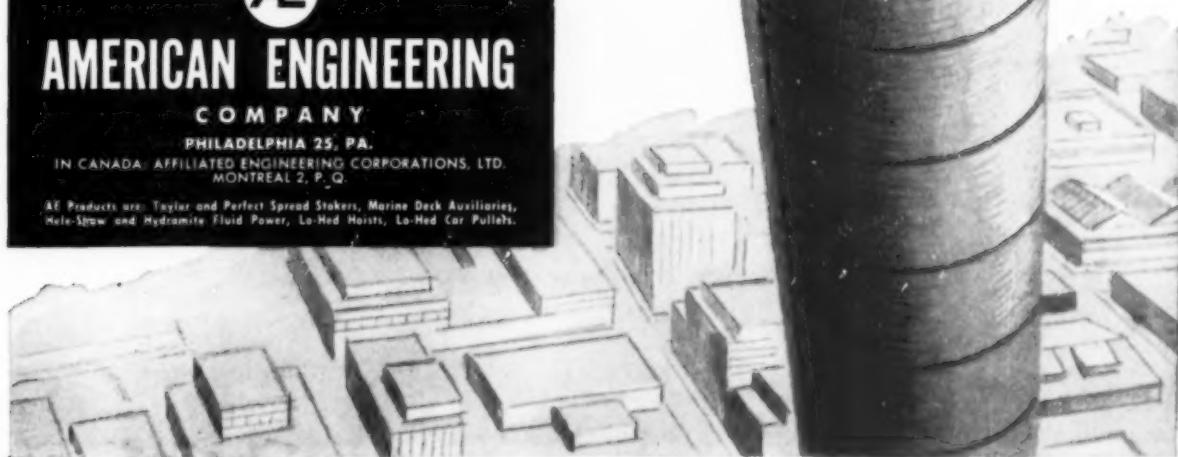
TAYLOR STOKERS are operating today in the heart of some of the finest urban areas... meeting ironclad stack discharge ordinances without expensive fly ash collectors and resultant draft losses... yet burning whatever types of coal cost least in each particular locality.

MATCHLESS EFFICIENCY

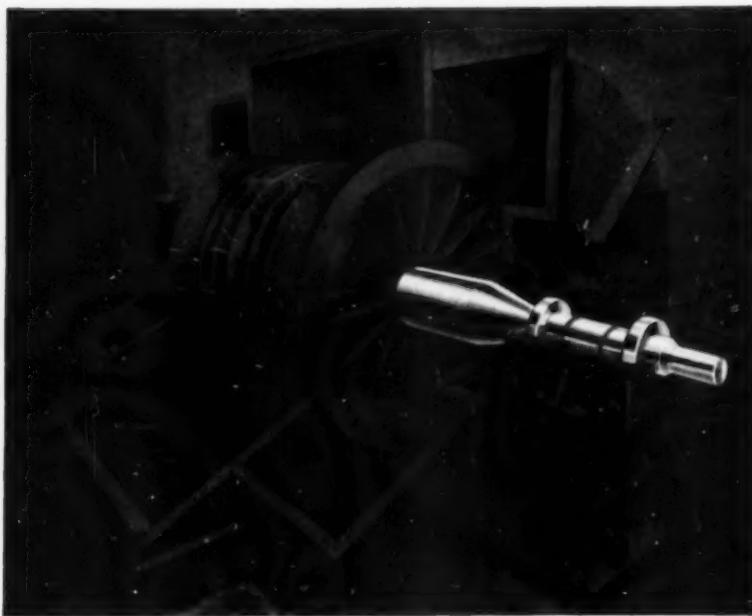
Smokeless operation and outstanding economy... higher average CO₂, minimum solids in stack gases... these are outstanding characteristics of engineered Taylor Stokers.

UP TO 500,000 LBS.

Whether you require 20,000 or 500,000 lbs. of steam per hour, ask your Consulting Engineer about Taylor, the completely modern stoker with the old, old name... write for descriptive literature. American Engineering Company, 2421 Aramingo Ave., Philadelphia 25, Pa.



How a FAN SHAFT Turns Out CHEAPER POWER



... in "Buffalo" Induced Draft Fans

This "Buffalo" Shaft is about to start saving money on a punishing draft job, because it's built for "no-time-out" service! Forged, annealed and precision-ground from a single solid piece of steel, it is oversize, so that its critical speed is well above highest operating speed. Note the substantial thrust collars, ground to fit the bearing very closely. Note the extra-heavy center portion which will bear the rotor. Here, certainly, is shaft construction to stand all the stresses and heat of high-pressure draft service indefinitely. And there's the same long-life toughness in all other parts of "Buffalo" Induced Draft Fans — the money-saving "Q" Factor — described fully in Bulletin 3750. Write for your copy today!



*The "Q" Factor — The built-in
Quality which provides trouble-free
satisfaction and long life.*

BUFFALO FORGE COMPANY
530 BROADWAY

BUFFALO, NEW YORK

Publishers of "Fan Engineering" Handbook

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
FORCED DRAFT COOLING HEATING PRESSURE BLOWING

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

Wide Range Steam Measurement

C-6 BUILDERS-PROVIDENCE, INC., Providence, R. I., in conjunction with the C. E. SQUIRES COMPANY of Cleveland, Ohio, has recently developed an engineered equipment package that makes possible the measurement of steam under widely different load conditions.

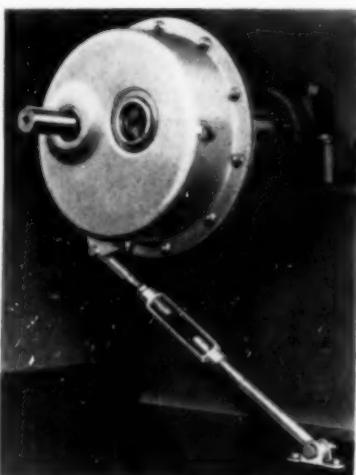
The principle involved is the division of flow from a high range to a low range Shuntflo Meter, whenever the demand on the system is low, by means of a compact changeover arrangement.

The device prevents overload and subsequent damage to low range meter; eliminates need for condensate meter with return lines and attendant maintenance problems; and eliminates need for changing meter capacities (orifices).

Shaft Mounted Drive

C-7 THE FALK CORPORATION, Milwaukee, Wisconsin, announces a new speed reducer which mounts directly on the shaft to be driven and requires no floor space other than that needed for the motor and tie rod connection. Unit is easily adapted to fit various driven shaft diameters.

A choice of single or double reduction makes possible the selection of almost any output speed between 420 and 14 rpm, merely by changing sheave sizes within allowable limits. Six sizes to cover the range from $\frac{1}{2}$ to 30 hp.



Comparatively high ratios of speed reduction in very limited space.

Undeniable Proof of



CONSECO offers:



CLOSED HEATERS



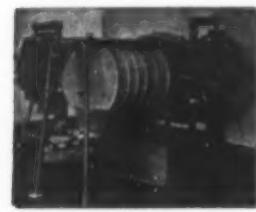
DEAERATORS



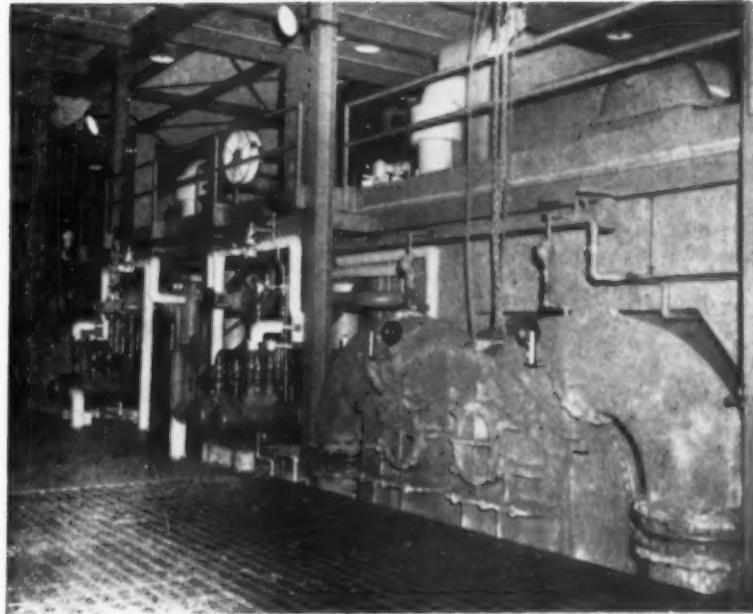
BOILERS



EVAPORATORS



REFINER FILTERS



2—10,000 sq. ft. Divided Flow CONSECO Condensers installed in the Humboldt, Iowa, plant of the Corn Belt Power Co-Op. Shown alongside these units are the Twin-Element 2-Stage CONSECO Air Ejectors and Single-Stage Non-Condensing Hogging Ejectors.

PERFORMANCE

1947 1949 1951	2—10,000 sq. ft. units installed and in operation 1—14,000 sq. ft. unit presently being installed 1—14,000 sq. ft. unit being constructed
---	---

All in the Same Plant

CONSECO engineers are available at all times to meet your specific requirements in heat exchanger equipment. Their long experience and the complete fabricating facilities of Condenser Service are assurance of your obtaining maximum performance and economy.

Send for illustrated engineering bulletins on CONSECO equipment.

Condenser Service & Engineering Co.
HOBOKEN, N.J.

154 OBSERVER HIGHWAY, HOBOKEN, N.J.

HO 3-4425

N. Y. Tel. BA 7-0600

For DOUBLE BOILER BLOW-OFF SAFETY



These EVERLASTING Duplex Boiler Blow-Off Units are assuring double safety in plants all over the country.

In the unit illustrated above, the left-hand valve is the standard quick-operating EVERLASTING design which opens with a quarter-turn of the lever and closes with a drop-tight seal that actually improves with use. The right-hand valve is an EVERLASTING Angle Valve, stoutly built to withstand shocks and abrasion of blow-down solids.

Below are shown two additional EVERLASTING Duplex Units, each including the EVERLASTING "Y" Valve . . . simple and sturdy in design, with all parts interchangeable with those of the Angle Valve.

All EVERLASTING boiler blow-off designs conform with ASME codes, and are available in a range of sizes for pressures up to 600 psig.

Write for descriptive bulletin.

EVERLASTING VALVE CO., 53 Fisk Street, Jersey City 5, N. J.

Everlasting Valves

TRADE MARK "EVERLASTING" REG. U. S. PAT. OFF.

EV572

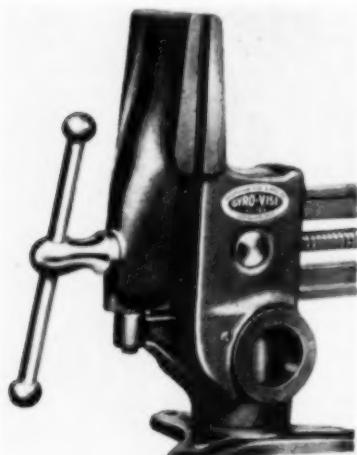
FOR EVERLASTING PROTECTION

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

All-Purpose Vise

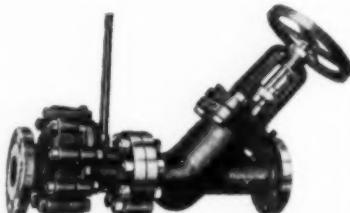
C-8 THE COLUMBIAN VISE & MFG. CO., Cleveland, Ohio, has announced the new all-purpose Gyro-Vise No. 72½, which operates from, and rotates around, a standard base which can be mounted in any desired location.



Regardless of its position, upright or flat, the vise moves in a full circle. It locks automatically in any selected position.

The jaws are 2½ in. wide and 4½ in. deep. Maximum jaw opening is 5 in. The manufacturer claims that these jaws will also hold paper-thin objects securely and without marring. Over-all height is 10½ in. and weight is 16 lb.

Two of the many available combinations of EVERLASTING Boiler Blow-Off Units



Air Conditioning System For Stand-By Buildings

C-9 SURFACE COMBUSTION CORPORATION, Dorr & Thomas Sts., Toledo 1, Ohio, has recently announced a new adaptation of its Kathabar humidity conditioning equipment, designed especially for storage warehouses and war production plants placed in stand-by condition.

The new units represent an effective combination of refrigeration and chemical dehumidification. An air-cooled compressor is used. The condensing coil is located in the leaving air stream, giving the system adiabatic operation.

The units work entirely on electric energy. They do not require the heating of the building in order to main-



every study shows a handling saving

80 TONS OF SUGAR PER DAY

SAVES \$30 ON EVERY CAR UNLOADED

RETURNS 84% OF ITS COST

Many companies are checking their handling problems against the American MonoRail Case Study File of "Engineered Applications." The file contains a series of case studies taken from many successful American MonoRail installations. One company saved \$30.00 on every car unloaded. Another doubled metal finish production. A glass plant moved 22 tons of glass batch per hour. Another installation returned 84% of its cost in one year. These are just a few of the many studies covered.

If you want to lower your handling costs, speed up production and cut maintenance overhead, let us send you this file. Just drop us a line on your business letterhead, asking for "Engineered Applications File F-1."



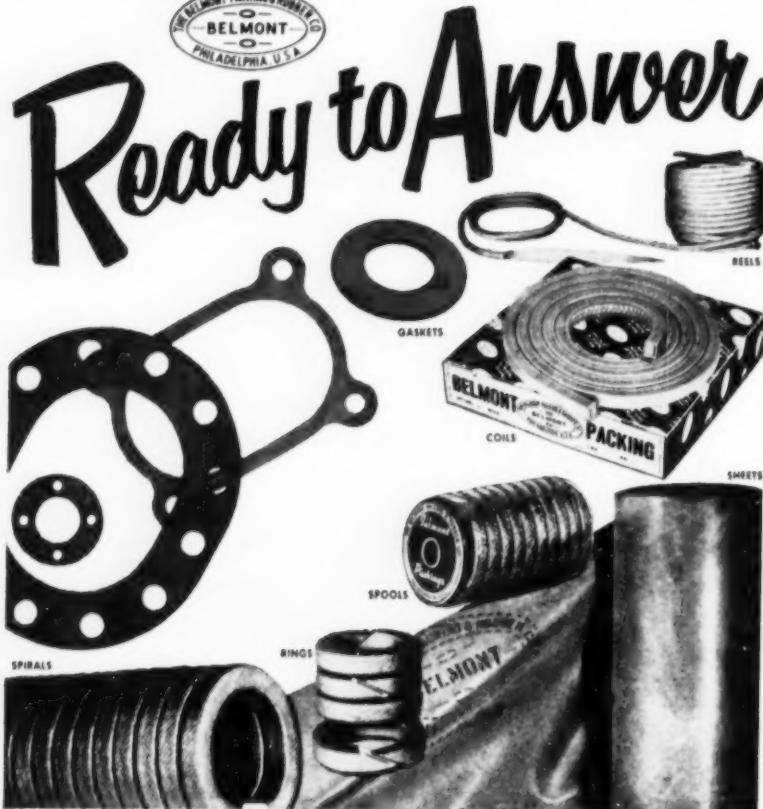
AMERICAN

OVERHEAD
HANDLING
EQUIPMENT

MonoRail

COMPANY
13105 ATHENS AVENUE • CLEVELAND 7, OHIO

BELMONT PACKINGS



Your Hurry Call!

Belmont Packings . . . in spool, spiral, ring, reel, coil and sheet form . . . each in a wide range of specially formulated materials to meet the diverse requirements of modern industry.

Once a routine maintenance job, selection and application of packings is now a specialized field requiring experience, dependability and real devotion to service. **HOWEVER, THESE REQUIREMENTS NEEDN'T ADD TO YOUR ALREADY HEAVY RESPONSIBILITIES!** There's always a Belmont packings distributor to help you anticipate trouble and . . . when emergencies do arise . . . come to your aid.

That's what we mean when we say that Belmont packings are ready to answer your Hurry Call. They're not only made right . . . they're sold right . . . available when you want them, where you want them . . . through a Belmont Distributor . . . dedicated to **YOUR** service.

WRITE FOR HIS NAME AND ADDRESS

4-P-1

THE BELMONT
PACKING and RUBBER CO.
Butler and Sepviva Streets
Philadelphia 37, Pa.

FOR STEAM • WATER • OIL • GAS
AIR • ACIDS • ALKALIES • AMMONIA

THERE'S A BELMONT PACKING FOR EVERY SERVICE

**RINGS • SPIRALS • COILS • REELS
SPOOLS • SHEETS • GASKETS**

BELMONT PACKING & RUBBER CO.
PHILADELPHIA 37, PA.
U.S.A.

new equipment (continued)

For more data circle Item code number
on the postage free post card — P. 17

tain 35% relative humidity, even to as low as 20 F temperature.

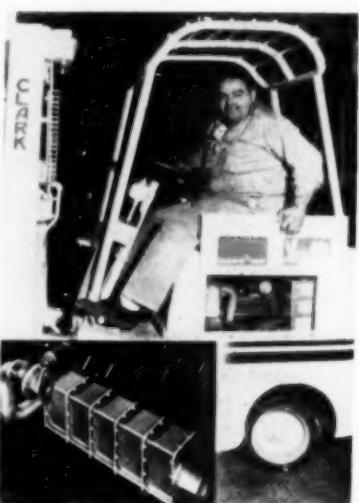
Low maintenance cost, reliability, and no carryover of absorbent are some of the advantages claimed for these units. Because they employ a liquid dehumidifying agent, it is possible to handle more air for the same or less investment. Greater air circulation in the conditioned spaces is thus obtainable.

Exhaust Purifier for Fork Trucks & Tractors

OXY - CATALYST, INC., C-10 Wayne, Pa., announces that the OCM catalytic exhaust is now available for factory installation on gasoline-powered lift trucks and tractors manufactured by **CLARK EQUIPMENT COMPANY**, Battle Creek, Michigan.

The OCM catalytic exhaust oxidizes more than 95 per cent of the carbon monoxide and hydrocarbons in the engine exhaust, converting them into harmless carbon dioxide and water vapor.

Standard sizes are available for installation by the truck dealer or by a mechanic in the plant. The regular truck muffler is removed and an OCM unit is installed in its place or when factory installed, the OCM catalytic exhaust is simply put on the truck in lieu of the regular muffler.



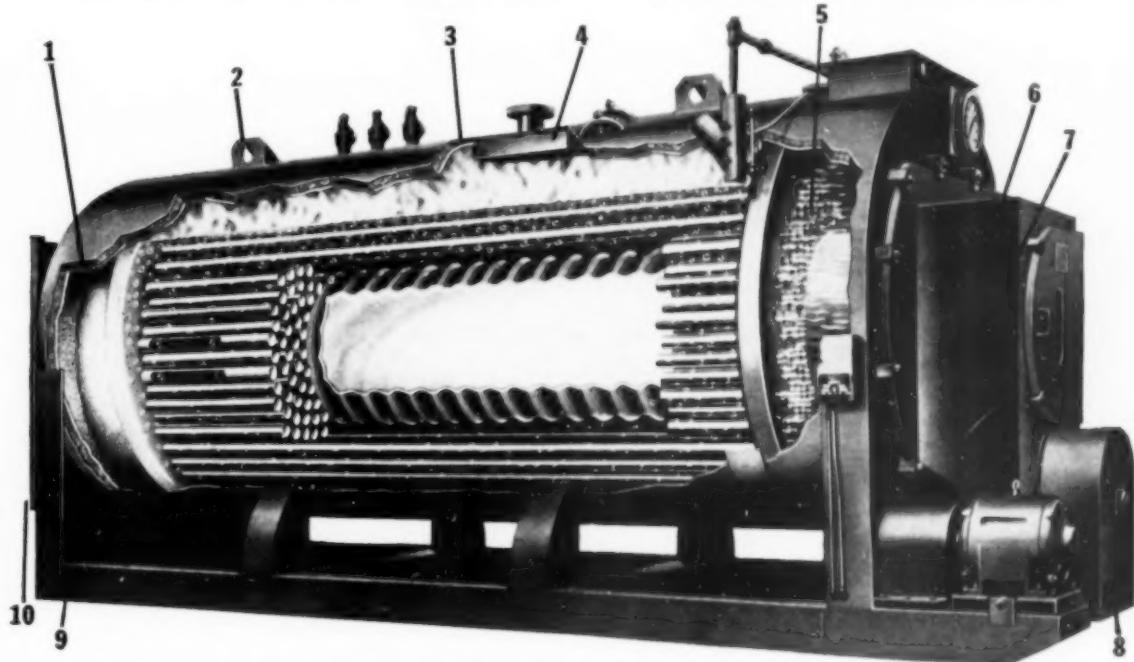
Carbon monoxide in engine exhaust oxidized, preventing harmful effects when trucks are operated indoors.

Points to look for when you select a Packaged Boiler:

- 1 Fiberglas insulation with metal jacket and metallic paint finish.
- 2 Lift lugs for convenient handling on job site.
- 3 Boiler shell made of flange quality steel. All joints electrically welded. High pressure shells X-rayed to insure flawless construction and long life.
- 4 Separator to assure dry steam supply (99%+).
- 5 Practical front-end construction provides open flow of combustion gases to stack. No refractories to maintain.

Entire burner front hinged, providing easy access to fire tubes.

- 6 Burner and its vital parts—such as fuel nozzles, flame scanner and ignition assembly—fully enclosed in steel housing for safe operation.
- 7 Dual air-flow burner—for oil or gas fuels—precisely fitted to the boiler furnace. Burner specially designed to mix fuel and air for high combustion efficiency. Heat transferred directly to water surrounding the furnace.
- 8 Air for the burner passes through an inlet silencer to a forced draft fan. Air flow controlled by adjustable dampers.
- 9 Structural steel base distributes weight evenly on boiler room floor. No special foundation required.
- 10 Hinged rear door lined with insulating refractory. Door can be opened in a few minutes—affording access to furnace and all return tubes. No need to remove and replace refractory baffles or brick work. Note sturdy hinge construction which insures positive sealing of door.



The CONTINENTAL Automatic Boiler

- Two-pass design—simple and practical. Range 20 to 500 hp.
- Factory-tested before shipment. Guaranteed 80% efficiency.
- Maximum radiant heat transfer from flame to water-cooled furnace walls.
- Even heat transfer—uniform flow of hot combustion gases through all return tubes.
- Free and rapid water circulation keeps all heating surfaces clean and improves transfer of heat to boiler water.

- High CO₂ and low stack temperature—guaranteed not to exceed 125°F. above saturated steam temperature at operating pressure.

CONTINENTAL BOILER DIVISION

BOILER ENGINEERING & SUPPLY COMPANY, INC.
1000 Manayunk Street • Phoenixville, Pa.

40 YEARS OF BOILER MANUFACTURING EXPERIENCE

CONTINENTAL is sold, installed and serviced
by competent distributors throughout the U.S.

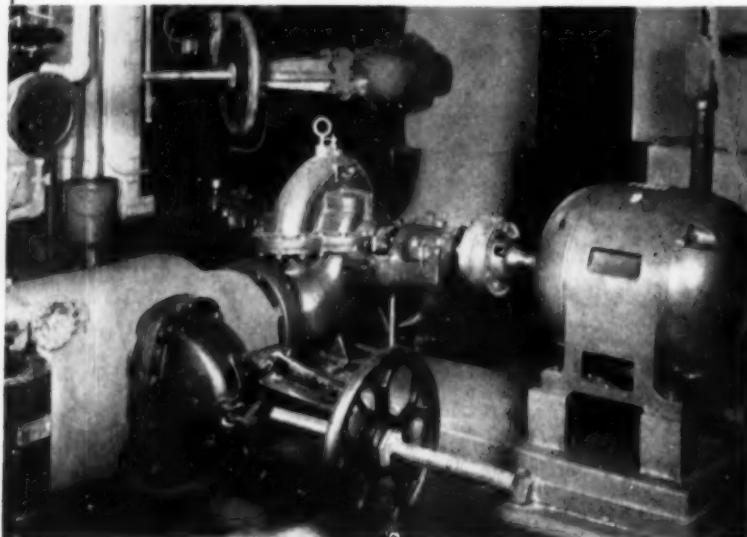
NEAT AS A PIN

very aptly applies

to the Power Plant and Air Conditioning services at
Springfield Fire and Marine Insurance Co.

SPRINGFIELD, MASSACHUSETTS

Not only "neat," but highly efficient, in keeping with this large and progressive organization.



Warren Centrifugal Pump, 1380 g.p.m. on condenser water return from cooling towers

EXPERIENCE is a basic, all-important factor in the insurance business . . . important too, in the manufacture of pumping machinery . . . and so

WARREN PUMPS

with well over half a century of experience in this field exclusively, were chosen for various services, including:

Condenser Water Secondary Water to Weathermaster
Snow Melting Primary Chilled Water

For Power Plant, Air Conditioning and all
pumping services, specify:



WARREN PUMPS

WARREN STEAM PUMP COMPANY, INC.

Warren, Massachusetts

Safety in N. C. Plant

(Starts on page 56)

monthly meetings the report and recommendations of the plant safety committee, and to assist in seeing that recommendations are carried out.

Suggestion System

Employees are encouraged to promote safety throughout the plant by a system which rewards worthwhile safety suggestions. A supply of the forms is provided at convenient locations in the plant, with a box in which to deposit them.

Completed suggestion forms are referred to the safety committee of the supervisory council (as previously outlined) for determination of their suitability, and later for the council to determine the monthly defense bond winner.

Acknowledgment of receipt of suggestions is made immediately, and the suggestions are accepted or rejected within 30 days. Suggestion blanks are numbered with a receipt attached, so that employees may remain anonymous until their suggestions are accepted. The reason for rejection of suggestions is given, by number, on the plant bulletin board.

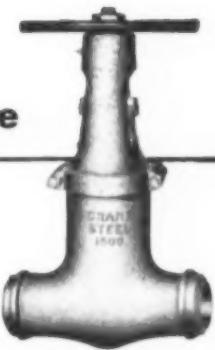
Typical bond-winning suggestions have been for a method of securing balance weights on pads to prevent them from flying off, for a new gear cover on a dye jig, and for construction of steps from the lower level of the plant parking lot.

First Aid Classes

In January, 1953, Hanes initiated a series of three-hour first aid classes for all employees desiring to take them, although attendance is not compulsory. Classes are given by *Carlis Fulk*, a graduate of the Red Cross first aid course for instructors. Each week classes are held an hour a day, on company time, until the three-hour course is completed. The course is given as often as 15 to 20 employees sign up for it.

Graduates of the three-hour course may take an 18-hour advanced course, which is given once a year. Classes are held in the evening, on the employees' own

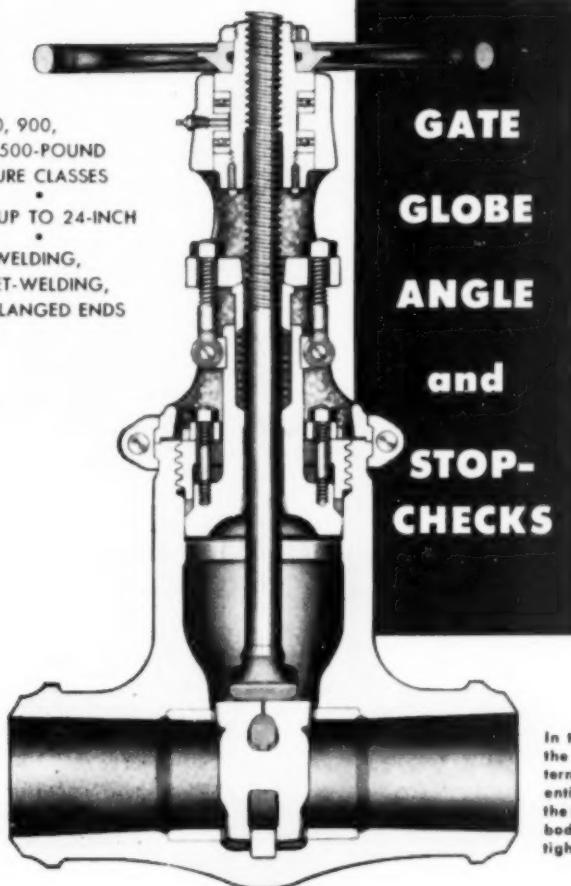
for high-pressure high-temperature service



here's what you get in

CRANE PRESSURE-SEAL BONNET VALVES

IN 600, 900,
AND 1500-POUND
PRESSURE CLASSES
•
SIZES UP TO 24-INCH
•
BUTT-WELDING,
SOCKET-WELDING,
AND FLANGED ENDS



GATE
GLOBE
ANGLE
and
STOP-
CHECKS

NO BONNET-JOINT LEAKAGE

... and therefore no bonnet-joint maintenance. Crane design utilizes internal fluid pressure to form a pressure-tight metal-to-metal joint.

SAVINGS IN WEIGHT AND SPACE

... up to 60% over conventional valves. Crane streamlined valve shape also minimizes service strains and stresses. Handling in erection and maintenance is easier. You can save on piping suspension, too.

STRAIGHT-THROUGH FLOW

... in gate valves, resistance to flow is minimized because inner diameter of body seat rings and inside surface of disc guide are in line. Globes and stop-checks also have excellent flow characteristics.

SMOOTH, EASY OPERATION

... for instance, in larger size gate valves, a flexible wedge disc prevents sticking ... is not "pinched" in the valve body by contraction as the result of cooling ... requires minimum torque to open.

CRANE QUALITY THROUGHOUT

... depending on service requirements, bonnet and body are Crane Carbon-Molybdenum or Chrome-Molybdenum Alloy Steels. All seating surfaces are long-lasting Stellite. Body seat rings are accurately fitted and welded, and cannot loosen in service.

Get better acquainted with this modern Crane line — ask your Crane Representative for a copy of folder AD1936, or write direct.

In the cross-section you can see how the bonnet joint is inside the valve. Internal fluid pressure, acting upon the entire underside of the bonnet, forces the bonnet against the seating between body and bonnet, forming a pressure-tight metal-to-metal joint.

THE BETTER QUALITY... BIGGER VALUE LINE... IN BRASS, STEEL, IRON

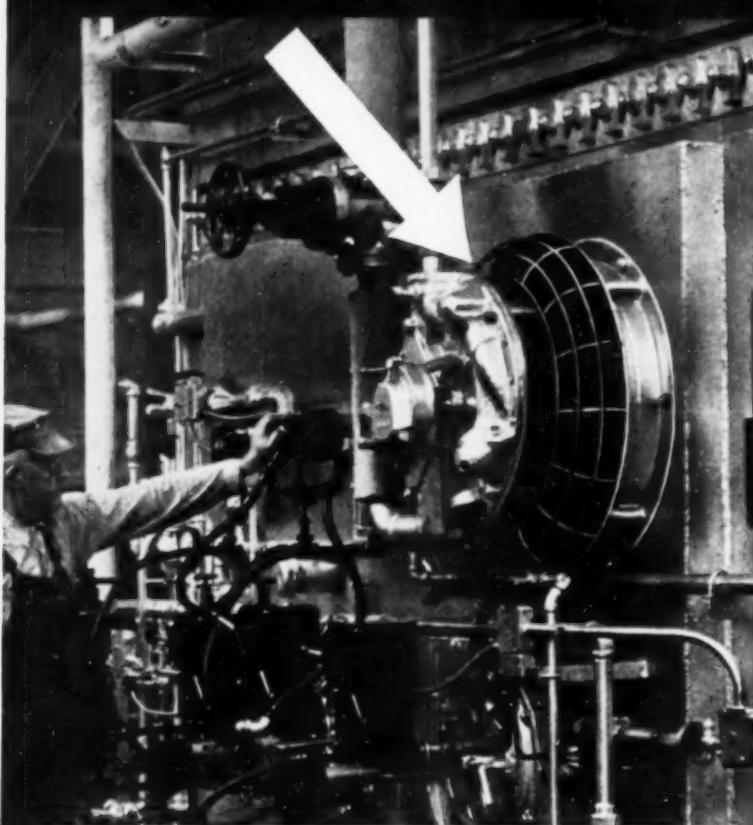
CRANE VALVES

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING



Only a WING Axial Flow Turbine Blower would permit such a compact installation



THIS neat, compact forced draft installation shows how the WING Axial Flow Turbine Blower can save thousands of dollars in installation costs by eliminating the duct work and excavation costs attendant on the use of other types of blowers. This compact, quiet, low-speed blower delivers 11,300 CFM at 3" static pressure to the 40,000 lb. per hr. B & W oil-fired boiler at the Chicago plant of Southern Cotton Oil Co., makers of the well-known Wesson Oil. This is the third Wing blower at the Chicago plant, the tenth in all Southern Cotton Oil plants, the first having been installed in 1916.

Wing

L. J. Wing Mfg. Co.

169 Vreeland Mills Road

Linden, N. J.

Factories:
Linden, N. J. and Montreal, Can.



UNIT HEATERS



FANS



BLOWERS



DRAFT INDUCERS



TURBINES

time. The course includes indoctrination in civil defense in case of enemy attack.

It is planned to have a graduate of the advanced first aid course working in each of three strategic locations in the plant. Each will have a complete emergency first aid kit checked out to him, and will go immediately to the scene when an accident occurs in the area for which he is responsible. The injured person will thus receive expert care without delay, and will not be moved except under the direction of competent authority.

Results

Although the expanded Plant Safety and Housekeeping Program has only been in operation since the beginning of 1953, good results are already apparent. A substantial decrease has been made over the same period last year in lost-time accidents per million man hours, the best measuring stick of plant safety conditions.

When the plant safety committee made its first inspection, several departments had unacceptably low scores. All of these have scored well over 90 on the last three inspections. The department with the lowest score on the first inspection effected such an improvement that it has had a perfect rating on every subsequent inspection.

Electrostatic Filters

(Starts on page 70)

trode is located in the center of each grid section, with all electrodes being connected to a common bus bar.

In operation, high voltage direct current of positive polarity is applied to each electrode with the extremities of each serration being grounded. This means that the fibers comprising the filter medium are at different voltages with each fiber being at a different potential than that of its neighbor. This results in the creation of an electrostatic field of force between each element of the medium which converges toward the fiber, with the strongest and most intense portion of the electrostatic field at the fiber surface.

The media in general use at the

present time in this fabric type of electronic air filter is a cellulose material which has been used for a number of years in standard dry types of air filters. There is also available a bonded glass type of media which may be advantageous in certain types of applications.

It will be noted from Fig. 5 that this unit is constructed in two sections with matched surfaces so that when the cell is loaded with media it presents a tight compact unit, thereby obviating the possibility of any air leakage within the filter element.

When the media has become loaded with dust, which is usually determined by the build-up in its resistance to air flow, it simply becomes necessary to remove the two sections and pull out the dirty media sheet.

The reloading of the clean media can be accomplished either by using a manual or a mechanical loader, both of which are available. No oiling of any sort is necessary and there are no washing operations requiring the use of water. The dirty media in each case is disposed of because of the low cost of media replacements.

The media type electrostatic air filter will still provide a high order of cleaning efficiency even if it should be electrically de-energized. This is of particular importance when one considers that many ventilating and air conditioning systems are turned off periodically and the chimney or "stack effect" produced by the duct system may introduce dust laden air into the filtered space.

Infrared at Work

(Starts on page 58)

it has cured out properly. Unless the cure is right the non-skid characteristic is not realized. By combining heat with air movement, the latex is heated sufficiently to force out the solvents without scorching or burning the rugs.

Rugs are carried through the oven on a flat conveyor with the backs up. The time required for curing is $\frac{3}{4}$ to 1 minute. One thousand watt lamps, clear type with wide angle gold plated reflectors, are used.



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The Fairbanks Co. — Distributors: Boston • New York • Pittsburgh • Rome, Ga.

An Appraisal of Atomic Power (Continued)

(Starts on page 52)

the most promising of these appear to be liquid sodium or a liquid sodium-potassium solution. These liquid metals do not require pressurizing; they have low-capture cross sections in addition to excellent heat transfer and corrosion-resisting properties. They permit an appreciable reduction in the size of the reactor as well as operation at higher temperatures. In addition an electro-magnetic pump may be used instead of the conventional mechanical pump thus eliminating difficult sealing and maintenance problems there.

The Power Plant

Figs. 4 and 5 show schematic arrangements of a steam power plant and a gas-turbine power plant using an unmoderated breeder reactor and a liquid-metal coolant. Only the simplest kind of power plants have been shown, it being clear that such refinements as regenerative feedwater heating in the steam power plant and intercooling, reheat and regeneration in the gas-turbine power plant could be employed.

The Heat Exchanger

The heat exchanger deserves special attention. It is obvious that if the radioactive coolant is to be isolated from the working fluid of the power plant, to avoid contamination of the turbine and other equipment, an absolutely

tight heat exchanger must be provided. Because repairs on the heat exchanger can be accomplished only after a very difficult decontamination procedure it is necessary that the exchanger have a very high degree of reliability.

Double-walled or concentric tubes are used to separate the coolant from the working fluid of the power plant. Sodium fills the annulus between the tubes in order to provide a good heat transfer bond between the coolant flowing inside the inner tube and the working fluid of the power plant flowing outside the outer tube. The sodium in the annulus is completely sealed off and is provided with detectors to monitor the leakage of the coolant, or the working fluid of the power plant, into the annulus.

Economics

Only very crude estimates of the capital and operating costs of an atomic power plant can be made at this time. It is to be hoped that experience gained from the design, construction, and operation of the atomic power plant proposed by the Atomic Energy Commission will permit more reliable cost estimates. Nevertheless a qualitative analysis of these costs can be made.

Several important factors need to be considered:

(a) If a steam power plant must operate below a temperature of 1000 F (about 900 F), imposed as the top limit on the reactor by present materials, this will represent retrogression in the design of the power plant resulting in higher costs in that area.

(b) A large steam power plant burning coal as a fuel costs about \$195 per kw of installed capacity today. About \$90 per kw is invested in the steam-generating equipment which would be replaced by the reactor, heat exchanger, and related equipment. Present estimates indicate that \$350 per kw would be a conservative figure for the reactor and its allied equipment.

(c) The atomic power plant has to be located in an isolated area which involves higher transmission costs and larger land holdings.

(d) A greater number of highly skilled personnel are required for the operation of an atomic power plant.

(e) Although a reactor will not "explode" the requirement of high integrity and reliability should serve to increase maintenance costs in at least the earliest plants.

On the other side of the ledger are these factors:

(a) It seems likely that metals or ceramic materials will become available to permit operation of the reactor at temperatures approaching 1500 F.

(b) It is reasonable to expect that the cost of the reactor can be reduced. Present cost estimates are based on reactors not specifically designed for a power plant. The elimination of costly moderators, such as beryllium, a cheap purification process for zirconium, or the availability of a cheaper structural material would do much to reduce the cost of reactors.

(c) The use of a breeder reactor which uses natural uranium or thorium and at the same time produces salable fissionable materials could reduce fuel costs to the point where the higher initial cost of the reactor would be justified. Furthermore, cheap nuclear fuels may make the thermodynamic advantages of higher temperature for the working fluid of the power plant less important.

(d) A market for the radioactive fission products could be an additional source of income.

By-products

It would appear that one of the most important economic aspects of atomic power is the possibility of breeding fissionable material to be sold as a by-product. It was noted earlier that one to three neutrons may be released on fission. A statistical average is about 2.5. This means that half a neutron is available for breeding provided none is lost due to parasitic losses.

We shall assume that 0.25 neutron is lost due to absorption in

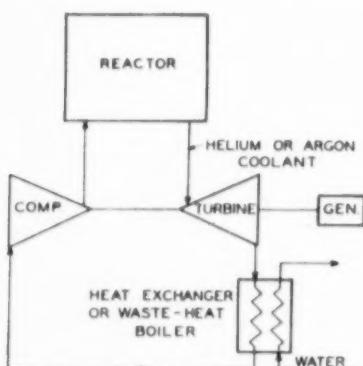


FIG. 5—Schematic arrangement of atomic closed-cycle gas turbine power plant.

nonfissionable reactor materials or through escape from the reactor. About 3.5×10^{10} Btu of energy are released in each fission. Then

$$1 \text{ lb Pu}^{239} + 2 \text{ lb U}^{238} = 1.25 \text{ lb Pu}^{239} \\ + 0.75 \text{ lb U}^{238} + 1 \text{ lb fission products} \\ + 3.5 \times 10^{10} \text{ Btu.}$$

The 0.75 lb U²³⁸ represents untransmuted U²³⁸ which is lost unless it can be cheaply separated from the spent fuel. This equation may be simplified as follows.

$$2 \text{ lb U}^{238} = 0.25 \text{ lb Pu}^{239} + 0.75 \text{ lb U}^{238} \\ + 1 \text{ lb fission products} + 3.5 \times 10^{10} \text{ Btu.}$$

The 0.25 lb Pu²³⁹ is excess and salable. The price of Pu-238 is currently about \$35 per pound and Pu-239 has a value of about \$30 per gram. The cost of the original fuel is \$70 and the value of the plutonium bred in the reactor is about \$3400.

Relative Costs

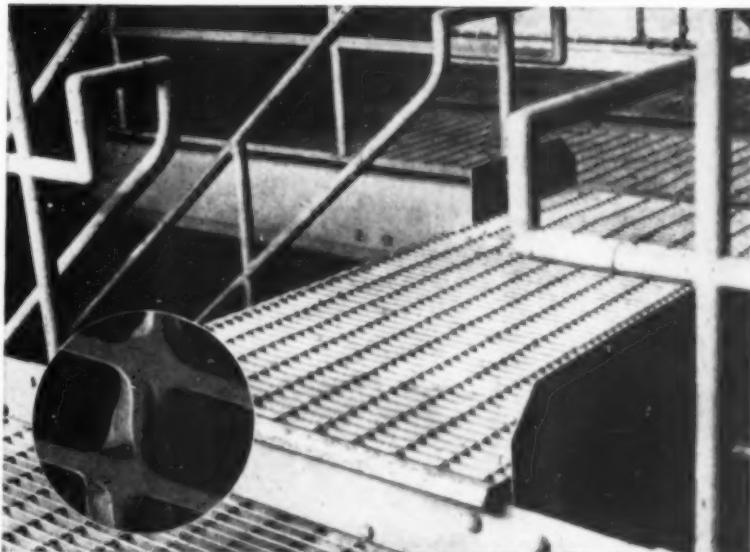
If we assume a 60,000 kw steam power plant operating 0.7 load factor and 26% thermal efficiency, from the above equation it is seen that about 274 lb of U-238 will be consumed annually with a production of 34.3 lb of Pu-239. The total cost of nuclear fuel will be \$9,597 but \$166,620 will be realized from the sale of Pu-239.

If we assume that coal costs 30 cents per million Btu, the savings in fuel costs amount to \$1,449,000 annually. This results in a net saving of about \$1,556,000. If this sum is capitalized for a term of 30 years at 6% interest \$357 per kw can be invested in the reactor and related equipment over and above the capital cost of a conventional steam generator. Not taken into consideration were the cost of processing the Pu-239 and differences in operating costs which are certain to exist.

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Texas Aluminum

(Starts on page 10)

through a 28-mile pipe line 24" in diameter constructed by the company.

Operations of the plant continue 24 hours a day, every day in the year. R. S. SHERWIN, JR., is Plant Manager at LaQuinta. The plant employs about 550 people.

Books for the Plant Engineer

Theory and Design of Steam and Gas Turbines

BY JOHN F. LEE
PUBLISHED BY McGRAW-HILL BOOK COMPANY
330 West 42nd St., New York 36, N. Y.
502 pages
Price, \$9.00

This treatment of steam and gas turbines is intended to furnish the practicing mechanical engineer with a fundamental background which will be of value in understanding the latest literature and making contributions in this rapidly developing field.

The author, an associate professor of mechanical engineering at North Carolina State College, presents the modern theory of turbine flow passage design in a manner understandable to the mechanical engineer who may not have a background in aerodynamics, or gas dynamics. Theory is critically examined and thoroughly explained.

Fluid Gasification of Oil

BY J. M. REID, W. J. MERWIN, C. G. VON FREDERSDORFF, H. R. LINDEN AND E. S. PETTYJOHN
PUBLISHED BY INSTITUTE OF GAS TECHNOLOGY
17 W. 34th St., Technology Center, Chicago 16, Ill.
50 pages
Price, \$5.00

This IGT Research Bulletin No. 16, "Fluid Gasification of Oil," presents a study of the application of fluid cracking techniques to high-Btu oil gas production.

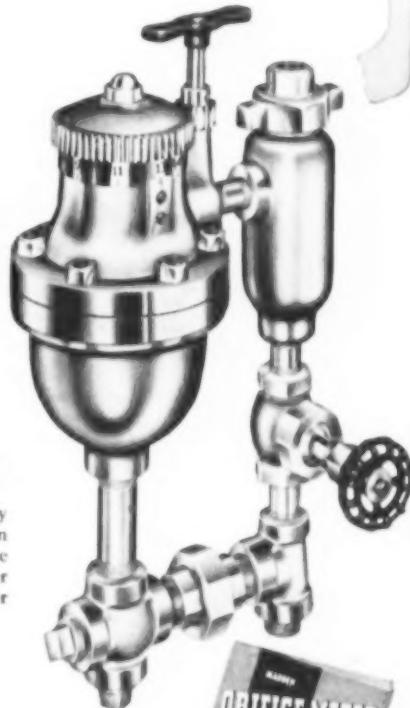
Fluidization studies, under the sponsorship of the American Gas Association, were carried out in small scale laboratory units. The most promising materials were tested for the following desirable characteristics as heat-transfer media: high thermal conductivity; high specific heat; high density; high softening point; and resistance to attrition. The bulletin presents results of fluid gasification studies made with a two-barrel per day pilot unit in which both distillate and residual oils were gasified.

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News for the South and Southwest (Continued)

(Starts on page 8)

Industry-Faculty Conference Scheduled for LSU in April

The Eighth Annual Industry-Faculty Conference will be conducted at Louisiana State University, Baton Rouge, on April 6-7, 1954. The theme for the Conference will be "Education and Industry."

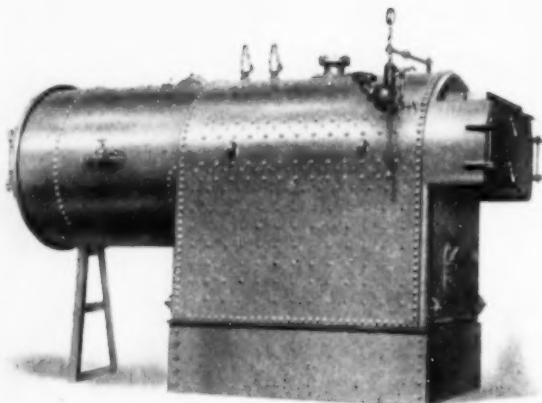
Registration will be Tuesday morning, April 6. Beginning at 1:00 P.M., there will be three speakers on the afternoon program; one for industry, one for education, and one for professional societies. Their talks will be directed toward such topics as recruiting and placement of graduates, postgraduate educational training, vo-

cational guidance, summer employment of faculty and students in industry, cooperative engineering curricula, professional development and scholarships and fellowships. The banquet speaker will be Dr. Kenneth McFarland, noted educator and Educational Consultant and Lecturer for General Motors Corporation.

Atlantic Steel Company Promotes R. E. O'Neill

R. E. O'Neill has been appointed general manager of sales for ATLANTIC STEEL COMPANY, ATLANTA, GEORGIA.

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R. E. O'Neill now general sales manager for Atlantic Steel Company.

Mr. O'Neill has been with the company since 1933. Starting in the rod mill warehouse, he then served in various capacities in the employment, timekeeping, shipping and order departments.

After four years with the Air Force during World War II, he became manager of Atlantic Steel's order department. In 1949 he joined the sales department, and was made manager of the rolled products division the same year. In 1952 he became assistant general manager of sales.

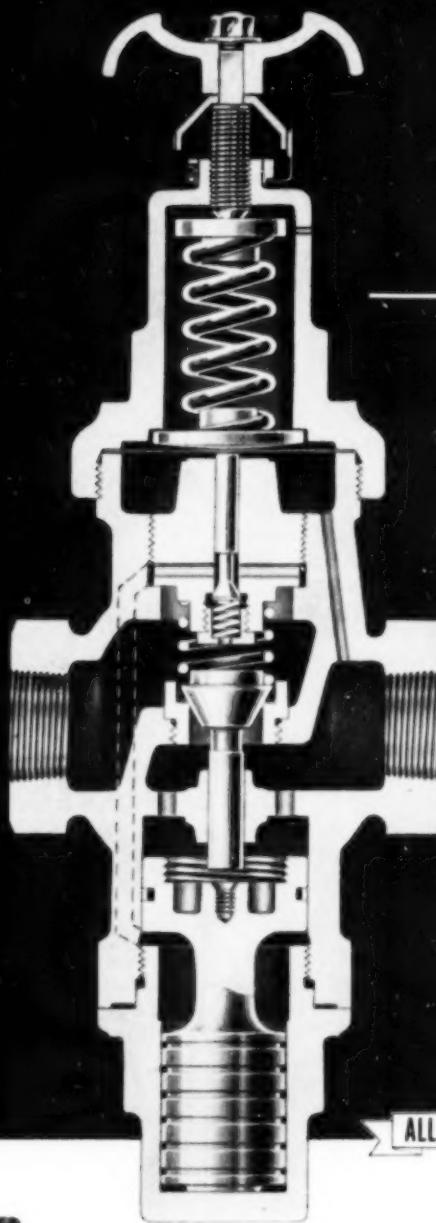
Southern Oxygen Granted A. O. Smith Franchise

Among the nine new distributor franchises recently granted by the Welding Products Division of the A. O. SMITH CORP. is that to SOUTHERN OXYGEN CO. at BLADENSBURG, MD.

Southern Oxygen is one of the largest independent producers of industrial gases and has Southern production facilities, in addition to Bladensburg, at KINGSPORT, TENN.; and GREENSBORO, N. C. The firm also has district offices at Baltimore, Md.; Roanoke, Richmond and Norfolk, Va.; Bluefield, W. Va.; Asheville, Raleigh and Charlotte, N. C.

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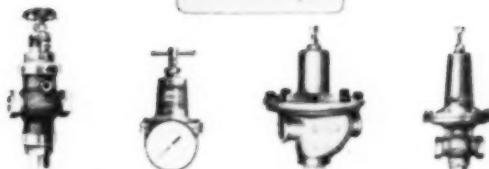
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Available for initial pressures up to 250 psi. Sizes $\frac{1}{4}$ " to 2" in bronze; $2\frac{1}{2}$ " to 4" iron; or $\frac{1}{2}$ " to 3" steel. For more information, write Mason-Neilan Regulator Company, 1206 Adams Street, Boston 24, Mass.

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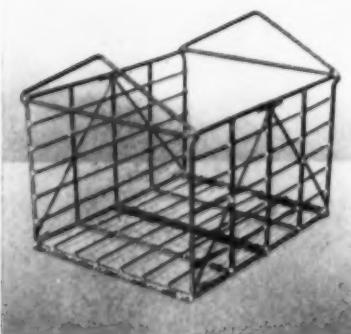
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news for the South and Southwest (continued)

**Mendow Succeeds Nelson
at A. M. Lockett—La.**

A. M. LOCKETT & COMPANY, LTD., NEW ORLEANS, LA., announces the retirement of MR. BERNARD STANLEY NELSON, Vice President in Charge of Engineering. Employed in 1907, as Junior Engineer, Mr. Nelson has been connected with the Lockett Company during the past 46 years.



F. Robert Mendow (left), succeeds Bernard S. Nelson (right), as chief engineer, A. M. Lockett & Company, New Orleans.

He became Chief Engineer in 1919 and in 1951, became Vice President. As Contracting Mechanical Engineers, this Company designs and builds complete plants embodying the heavy mechanical equipment which they represent and, as a result, Mr. Nelson has been in active charge of the design and construction of many types of plants—particularly power, waterworks, irrigation, drainage and creosoting plants.

Succeeding Mr. Nelson is MR. F. ROBERT MENDOW. Mr. Mendow joined A. M. Lockett & Company's organization after his graduation from Tulane University in the Class of 1930, where he received the Tau Beta Pi Honorary Award. He is an active member of the local section of the American Society of Mechanical Engineers and of the Engineers & Architects Club.

**B. Wilson Bird of Atlantic
Steel Dies Unexpectedly**

B. WILSON BIRD, manager of the Fabricating Division of ATLANTIC STEEL COMPANY, ATLANTA, died unexpectedly at his home on January 24.

A native of Omaha, Georgia, Mr. Bird attended Georgia Tech. He had been with Atlantic Steel 20 years. Early in 1952, he was named manager of the Fabricating Division, which includes the products of the Manufacturing Department as well as fabricated bars.

Name Change—Richmond Steel

The name of the Richmond Structural Steel Co., Inc., 18th and East Byrd Sts., RICHMOND, VIRGINIA, has been changed to RICHMOND STEEL CO., INC.

Richmond Steel fabricates and warehouses complete stocks of steel beams, bars and channels, angles, sheets, plates, rivets, bolts, steel sash, bar joists, reinforcing bars, wire mesh and steel buildings, steel bridges and barges. The company maintains complete departments for the design, fabrication and erection of all forms of structural steel and ornamental iron, with facilities supplying every detail from drawing board to completed projects.

Officers of Richmond Steel Company are Carter N. Williams, Jr., Chairman of the Board; Carter N. Williams, III, President; Charles L. Williams, Thomas N. Williams and W. H. Chapman, Vice-Presidents; A. Bernard Cosby, Treasurer, and Jack Houck, Sales Manager.

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OIL, GAS & GAS-OIL
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New Officers Elected; W. R. C. Smith Pub. Co.

WILLIAM J. ROOKE has been elected to Chairman of the Board and RICHARD P. SMITH has succeeded him as President of the W. R. C. SMITH PUBLISHING COMPANY, Atlanta. Both will continue full time executive duties with the company as in the past, with Mr. Rooke supervising editorial and business staffs of the company's five merchandising magazines and Mr. Smith giving leadership to the industrial publications: SOUTHERN POWER & INDUSTRY, and TEXTILE INDUSTRIES.



William J. Rooke (left), chairman of the board, and Richard P. Smith, president, W. R. C. Smith Publishing Company.

Mr. Rooke is a past President of The Associated Business Publications, and is currently Vice Chairman of the National Business Publications, Inc., Vice President of the Atlanta Chamber of Commerce and a Director of the Bank of Georgia. He has been with W. R. C. Smith Publishing Company for over forty years. He was made Executive Vice President in 1931 and President in 1937. He is a Phi Beta Kappa graduate of Western Reserve University, Cleveland, Ohio.

Mr. Richard Smith is the youngest son of the late W. R. C. Smith who founded the company in 1905. He is currently Chairman of the Board, Rotary Club of Atlanta; a Director, Atlanta Child's Home and The Business Publications Audit, Inc.; Trustee of the Youth Service Fund, Inc., and the Rotary Educational Foundation, Inc. He was educated in the Atlanta public schools before going to Cheshire Academy, Connecticut. He was graduated from the Virginia Military Institute, Class of 1934, with the degree of Bachelor of Arts. Mr. Smith served in the United States Army during World War II, with the rank of Lieutenant Colonel, Field Artillery.

Appalachian Power Promotions

R. E. HODGES, division manager of APPALACHIAN ELECTRIC POWER CO. at CHARLESTON, WEST VIRGINIA, has been promoted to assistant general

manager of the company at ROANOKE, VIRGINIA. JOE P. GILL, formerly district manager at Logan, succeeds Mr. Hodges at Charleston.

MILLER C. PORTERFIELD, who has been assistant manager of the Welch district, replaces Mr. Gill at Logan.

Metal Products Changes Name — Miami, Florida

Metal Products Corp., 807 N.W. 20th St., MIAMI 37, FLA., has changed its name to AMERICAN SCREEN PRODUCTS COMPANY, according to a recent announcement by JOHN D. FOSKETT, president. The company manufactures quality window screens and rolling door hardware, under the seal of Homeshield Products.

Reynolds Metals Installs Private Telegraph Network

REYNOLDS METALS COMPANY in RICHMOND, VIRGINIA, and LOUISVILLE, KENTUCKY, has officially inaugurated service on the largest industrial private-wire telegraph network in the South.

The wire network, installed by Western Union for Reynolds Metals, links telegraphically all the aluminum firm's plants and major sales offices. There are 48 stations on the system, which is designed to transmit a message in an average time of three minutes. Key information is automatically retained for record purposes. The new network has about 12,000 miles of circuits in 23 states, linking Reynolds facilities from coast to coast.

Trane Co.—Pensacola

Appointment of MARVIN R. CLEMONS to a new branch sales office in PENSACOLA, FLORIDA, has been announced by THE TRANE COMPANY, manufacturers of air conditioning, heating and ventilating equipment. The Pensacola sub-office will operate in conjunction with the Birmingham, Alabama, sales office.

Clemens is a graduate of Louisiana State University and was formerly associated with the firm's New Orleans sales office.

Rivett Lathe & Grinder Names Ficke—Kansas

RIVETT LATHE & GRINDER, INC., has announced the appointment of FICKE ENGINEERING & SUPPLY COMPANY, 305 Pattie Ave., WICHITA 7, KANSAS, as representative for the company's line of air and hydraulic valves and cylinders and power units.

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★ In contrast to link-type belts these ALLIGATOR fastened V-Belts have just one strong joint . . . stretch and follow-up maintenance are reduced to a minimum.

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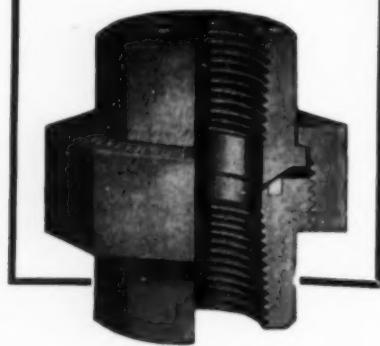


Ask for Bulletins V-215 and V-216
Order From Your Distributor

FLEXIBLE STEEL LACING COMPANY
4625 Lexington Street, Chicago 44, Illinois

ALLIGATOR
V-BELT FASTENERS

**Preference
is for . . .**



jefferson
UNIONS

because:

**... they are easier to set up
and permanently leakproof**

The following details of design and construction of Jefferson Unions contribute to their outstanding performance and economy:

... made of air-refined malleable iron having a tensile strength of 55,000 p.s.i.

... leakproof tightness assured by a true spherical brass seat recessed so as to avoid pipe ends ever coming in contact with it.

... seat rings of drawn seamless brass tubing press-fitted into machined channels so that they cannot rock loose.

A Type and Size for Every Service

Completeness of the Jefferson line simplifies piping installation and saves material. The line includes: unions, union elbows and union tees in Jefferson 300#, Excel 250# and Master 150#; also flanges in Jefferson 300# and unions in Enduro 300#. All lines are also available with all-iron seats. Underwriters approved.

Get in touch with your nearest distributor or with us direct.

JEFFERSON UNION CO.

650 W. 26th St., New York 1, N. Y.
79 Gooding St., Lockport, N. Y.
45 Fletcher Ave., Lexington 73, Mass.

news for the South and Southwest (continued)

Vulcan Steel Container Co. Appoints Mitchell—Alabama

Appointment of RAY I. MITCHELL as Sales-Service Representative for VULCAN STEEL CONTAINER CO., BIRMINGHAM, ALABAMA, has been announced by Gordon D. Zuck, president.



Ray I. Mitchell

Mitchell is a graduate of the University of Alabama. He served in the Navy during World War II, and has been doing special sales work since. He will have headquarters at the company's main offices and plant in Birmingham and will contact users of steel pails and drums throughout the South as a special representative.

Preferred Utilities Names Nevans Company—Houston

PREFERRED UTILITIES MANUFACTURING CORPORATION of Danbury, Conn., announces the appointment of THE NEVANS COMPANY of HOUSTON, TEXAS, as exclusive sales representative for the Preferred Unit Steam Generator in the east Texas area.

The Nevans Company, directed by THOMAS L. B. WEBB, has been active for the past five years in the Gulf Coast area in providing engineering and equipment relating to industrial water and power plant requirements. Mr. Webb has had extensive experience with Dow Chemical Company, DuPont Company, and Southern California Gas Company.

Rice Institute Exposition

The 14th biennial Rice Institute Exposition of Engineering, Science, and Arts is scheduled for April 2 and 3 on the Rice campus in HOUSTON, TEXAS.

This show displays the work of the various departments of the Rice Insti-

tute, with emphasis on engineering and science. Students construct and operate all exhibits in addition to managing the show.

Electrical engineers are planning three-dimensional television and a wrist radio utilizing transistors. The mechanical engineering department will demonstrate the "Garrett Prest-Air Cooker," designed and patented by a student. Chemical engineers will rely on optical illusions to show off a wall of flame and floating brass weights. Civil engineers plan to have a working model filtration plant.

This year the show, which has formerly attracted as many as 50,000 visitors, is expected to be the most complete in history. A notable example of new buildings on the campus which will be of interest is the Nuclear Research Laboratory, with its 7,000,000 volt Van de Graaf accelerator.

Scaife Co.—Southeast

SCAIFE COMPANY, Oakmont, Pa., manufacturers of pressure vessels for air, gases and liquids, announces that W. T. BRYSON is now sales supervisor in ATLANTA, GEORGIA, and will cover the states of North and South Carolina, Georgia, Alabama, Mississippi, and Florida.

DEAN WAGONER, with headquarters in GREENSBORO, NORTH CAROLINA, continues to represent the company in North and South Carolina.

Borolite Corp. Officers

BOROLITE CORPORATION, Niagara Falls, N. Y., recently formed by FIRTH STERLING, INC., AMERICAN ELECTRO METAL CORPORATION and THE CARBORUNDUM COMPANY to develop and manufacture various metal borides for high temperature applications, has named officers of the new company.

General Clinton F. Robinson, Carborundum's president, was named a director and president; Kenneth D. Mann, president of Firth Sterling, and Dr. Paul Schwarzkopf, president of American Electro Metal Corporation, were elected vice presidents and directors.

Hill Chase Steel Co.—Md.

The Directors of THE HILL CHASE STEEL CO. OF MARYLAND, distributors of steel and aluminum with headquar-

ters in Baltimore and offices in Richmond, Roanoke, Asheboro, and Norfolk have elected the former President, John J. Hill, Jr., to Chairman of the Board of Directors; William E. Hill, President and Treasurer; J. J. Hill, III, Vice-President, and Robert M. Finley, Vice-President and Secretary.

The Hill Chase Steel Company of Maryland began its Baltimore operation in 1946 and has become one of the largest steel and aluminum distributors on the eastern seaboard.

Pocahontas Fuel—Virginia

WILLIAM C. MCINTOSH of RICHMOND, VIRGINIA, has been appointed service engineer for the Southern Sales Division of the POCOHONTAS FUEL COMPANY.

Mr. McIntosh is a native of Farmville, Virginia, and was graduated from the Virginia Polytechnic Institute in 1949. Since that time he has been employed as a mechanical engineer by the Commonwealth of Virginia.



Reynolds Metals Opens New Arkansas Plant

REYNOLDS METALS COMPANY's new Robert P. Patterson aluminum reduction plant, located near Arkadelphia, Arkansas, is now in operation. The facility, named in honor of the late company vice-president and director, has an annual rated capacity of 110 million pounds of virgin aluminum. Completion of the new plant is another important milestone in the aluminum industry's general expansion program; its operation gives Reynolds an annual production capacity of 829 million pounds.

J. W. HUTCHISON is manager of the new plant, which cost an estimated \$34 million. Its construction was entirely privately-financed. The facility, the most modern of its type, is located on a 780-acre site south of Arkadelphia, just off U. S. Route 67, the main highway between Little Rock and Texarkana. The "pot rooms," where metallic aluminum is produced, are 1827 ft in length. About 400 workers will be employed when the plant reaches full production.

Accessory operations include a general administrative office, laboratory, carbon electrode plant, auto storage facilities, steam plant, and other structures.

Aluminum, the plant's end product, was used extensively in its construc-

tion. Aluminum siding covers many of the buildings, and aluminum bus bar is used for transmitting the massive quantities of electricity to the "cells" where the molten metal is produced. To convert alternating electric current into the direct current necessary for the operation, a high installation of rectifiers was erected, tubes of which resemble giant radio tubes.

The opening of the Patterson plant marks continued Reynolds expansion in Arkansas. The firm operates another reduction plant in the state—its Jones Mills facility, located in the northern end of Hot Spring County. Alumina, which is converted into metallic aluminum at the reduction plants, is supplied by the Reynolds alumina plant at Hurricane Creek. And the basic aluminum ore—bauxite—is mined by a subsidiary firm, Reynolds Mining Company, near Bauxite, Arkansas.

Main contractors were Dittmars-Dickmann-Pickens Construction Company, Little Rock, and W. S. Bellows Construction Company of Houston. Structural steel work was handled by the American Bridge Division, U. S. Steel and the electrical construction by Fagan Electric Company, Little Rock. Midwest Construction Company, Tulsa, was a sub-contractor.

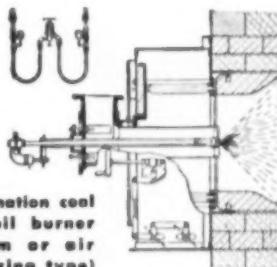
Enco OIL BURNERS

have these
7 ADVANTAGES
in pulverized coal
fired boilers . . .

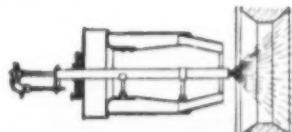
They may be installed in practically all types of pulverized coal burners, with these seven important advantages:

- They warm up cold furnaces
- They ignite pulverized coal—safely
- They assure continuous operation in case coal system fails
- They provide efficient and safe operation on bank and at low loads
- They respond almost instantly to sudden load changes
- They permit operation with oil or coal—whichever is available and lowest in cost per BTU.
- All capacities of steam, air or mechanical-atomizing types are interchangeable

The foregoing are only a few of the reasons why Enco oil-burners have been bought by a long list of leading industrial firms. Details of how Enco oil-burners can be adapted to your present pulverized coal burners will be gladly supplied—without obligation. Write The Engineer Company, 75 West St., New York, N. Y.



Combination coal
and oil burner
(Steam or air
atomizing type)



Combination coal and oil burner
(Mechanical atomizing type)

Enco Burners



UTILITY EXECUTIVES and engineers attending the one-day New Orleans conference and exhibit included H. CHESTER GAUSE, manager, industrial power sales, Alabama Power Company, Birmingham; CLARENCE M. KILIAN, advertising manager, Alabama Power Company, Birmingham; R. H. JACKSON, manager of apparatus sales, southeast district, General Electric Company, Atlanta; FRED W. MCCHESEY, manager of industry sales procedures, General Electric Company, Schenectady; S. L. DRUMM, vice president, New Orleans Public Service Inc., and G. C. RAWLS, vice president, Louisiana Power and Light Co.

Industrial Productivity Forum—New Orleans

New ideas for increased production presented by Louisiana Power & Light Company, New Orleans Public Service and General Electric.

Ten speakers—each a specialist in industrial productivity—appeared in a one-day INDUSTRIAL PRODUCTIVITY FORUM, held at the Roosevelt Hotel, New Orleans, La., in January. Representatives from Louisiana and Mississippi industries attended the exhibits and forum, sponsored by the General Electric Company, Louisiana Power and Light Company and New Orleans Public Service Company.

The program, featuring the latest industrial productivity techniques, was opened by H. H. BLAKESLEE, manager, La.-Miss. apparatus division, General Electric Co., New Orleans. Keynote speaker was F. W. MCCHESEY, manager, industry sales procedures of General Electric's industrial divisions in Schenectady. Mr. MCCHESEY, a veteran of more than 30 such Industrial Forums throughout the country, spoke on "New Ideas For Increased Production."

POWER DISTRIBUTION was discussed by E. W. MORRIS, district switchgear specialist, General Electric Co., Atlanta. He emphasized that the power system is the "keystone" in all programs for increased productivity. The presentation pointed up how more usable power, greater protection, and better service continuity are economically provided by modern power distribution practices.

Commenting on ADJUSTABLE SPEED DRIVES, J. S. APPERSON, manager, speed variator sales, General Electric

Co., Schenectady, showed that the post-war developments in greater power, higher feeds and speeds, automatic cycles and automatic work handling are not being used to full potential. They afford time-saving, money-saving opportunities while speeding up production.

J. A. LONG, district heating specialist of G.E. in Atlanta, gave a comprehensive review of the role of ELECTRIC HEATING in manufacturing processes including air heating, liquid heating, metal melting and pipeline heating. He also covered electronic heating, including induction and dielectric.

In the face of steadily-mounting costs, management was advised by C. B. ELLEDGE, manager, material handling sales, G.E., Schenectady, to discard obsolete methods of handling and substitute fast, economical electrical methods—conveyors, cranes, hoists, battery trucks and locomotives. Manhours so conserved can often be diverted to other plant operations.

ELECTRONIC CONTROLS, as used so effectively in counting, sorting, matching, controlling, to provide unerring automatic work cycles, were described by H. L. PALMER, manager, engineering specialty control department, G.E., Schenectady. Other discussions covered Good Industrial Lighting, Scheduled Maintenance, and What's Ahead in Research.

G. C. RAWLS, vice-president of

LOUISIANA POWER AND LIGHT, closed the forum with a summary of present and future plans for production of power to meet the needs of expanding Louisiana and Mississippi industry.

J. V. MORTON, manager of the industrial division, of the industrial engineering and utilization department, NEW ORLEANS PUBLIC SERVICE, was general chairman of the committee on arrangements for the forum.

Instrument Exposition

THE FIRST INTERNATIONAL INSTRUMENT EXPOSITION, sponsored by the Instrument Society of America, has already received contracts from 287 exhibitors for 573 exhibit booths at the Philadelphia Convention Hall, September 15-21, 1954. With only a few booths still available, the management has found it necessary to contract for additional space. More than 25,000 visitors from all parts of the country and many foreign countries are expected to attend.

Further information may be obtained by writing the Managing Director, First International Instrument Congress and Exposition, 845 Ridge Avenue, Pittsburgh 12, Pennsylvania.

Oakite Award—Memphis

Oakite Products, Inc., has presented a D. C. Ball Distinguished Service scroll to GRANT WILLIAMS, a veteran of ten years service with the firm, and since 1949 its representative in MEMPHIS, TENNESSEE.

Each year the company, manufacturer of industrial cleaning and related materials, makes awards in memory of its founder to those members of its nationwide field service organization who have rendered exceptional service to industry.

Tube Turns Becomes Div. of National Cylinder Gas

NATIONAL CYLINDER GAS COMPANY has simplified its corporate structure. TUBE TURNS, INC., manufacturer of welding fittings and forgings, with headquarters in LOUISVILLE, KENTUCKY, has become the Tube Turns division. Pennsylvania Forge Corporation of Philadelphia, producer of flanges, rings and heavy forgings, has become a division known as Pennsylvania Forge Company. The Hollup Corporation of Chicago, and National Cylinder Gas Company—Pacific Coast, have been dissolved.

Penn Names Snyder—Oklahoma.

SNYDER COMPANY, INC., specialists in flow, temperature and pressure control instruments and valves, have been appointed representatives for PENN INDUSTRIAL INSTRUMENT CORPORATION of Philadelphia.

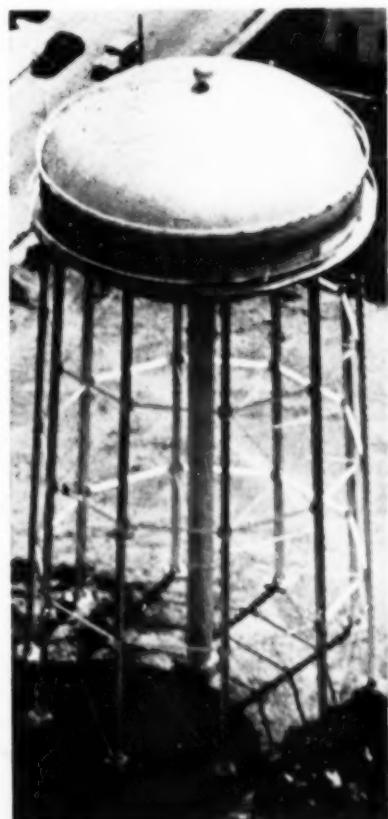
With headquarters in TULSA, OKLAHOMA, Snyder Company will have exclusive distribution of all Penn Products in the entire state of Oklahoma, the Panhandle of Texas, and North and West Texas.



Huge Permanent Alnico Magnetic Pulley Used in Alcoa's Mobile, Alabama, Plant

ONE OF THE world's largest and most powerful permanent Alnico magnetic pulleys ever built—42" diameter, 38" crown face, and 36" belt width—is installed in the Aluminum Company of America plant at Mobile, Alabama.

The pulley, manufactured by The Homer Manufacturing Co., Inc., Lima, Ohio, is used by Alcoa to handle bauxite ore at the Port of Entry. It is installed in a 200 ft long slope conveyor, operating at 27 rpm, giving a belt speed of 300 fpm, to handle 600 tph of bauxite ore. The slope on the conveyor amounts to 3½ ft per 12 ft length. Depth of material varies, and at times runs to 8 inches.



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IN BUILDING TANKS

FOR almost a century Cole elevated tanks have provided a dependable water supply for mills and communities. Cole quality is assured by careful, experienced designing and watchful supervision from blueprints to finished tank. Send us your inquiries for tanks from 5,000 to 2,000,000 gallons—stating capacity, height to bottom, and location.

Write for latest catalog — "Tank Talk."

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"The Profit-Eating Heating Bill"

Now... Stop profits from being gobbled up by outmoded heating systems in your plant!

New THERMOBLOC Heating for Industry

Needs no costly pipes, ducts, radiators, installations. Direct-fired, self-contained Unit Heaters heat even coldest spots in minutes with less fuel! Ideal for large open areas, eliminates work slowdowns due to cold corners. Thermoblocs are reducing costs, improving heat in hundreds of plants, warehouses, etc., today. See how Thermoblocs can solve the "profit-eating heating bill" in your plant, too!

How THERMOBLOCS

Cut Costs

Cost less to buy and install. Fully automatic, require no attendant. Heat circulates directly at working level, no fuel lost to high ceilings. Operate independently, start up only those units needed.



Give Ideal Heat

Forced circulation of live warm air assures instant, uniform heat even in large unpartitioned areas. High efficiencies assured, using gas or oil. Connect to fuel and power line and start heating. Beautifully styled.

Protect Equipment

Uniform, dry heat safeguards perishables, prevents rusting of delicate machinery.

For complete details on how to solve your heating problem, write for New Executive Bulletin on THERMOBLOC today.

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Manufacturers of the well-known P D Power Plant Equipment

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31-2 Meadow St., S. Norwalk, Conn.

Gentlemen:

Please send me literature on how to save heating costs with THERMOBLOC.

Name _____ Title _____

Company _____

Address _____

Atlantic Steel Co.—Ga.

ATLANTIC STEEL COMPANY, ATLANTA, has been appointed by the Great Lakes Steel Corporation of Detroit to distribute steel Quonset and Long-Span buildings, Stran-Steel nailable framing and structural sections in 101 Georgia counties, 33 Alabama counties, 51 middle Tennessee counties and 3 counties in South Carolina near Savannah.



John T. Butler, assistant manager of the Warehouse Division, Atlantic Steel Company.

Atlantic Steel Company will also serve as dealer for the products in the Atlanta area. JOHN T. BUTLER, assistant manager of the Warehouse Division, will head up the new activity. J. D. MURPHY, steel building specialist, will assist Mr. Butler and JOHN F. NELSON will continue to handle sales of the products.

Three members of the Mid-South Steel Company, former distributor, have joined the Atlantic Steel Company: JOHN WHITE and C. DICK CARMACK, who will serve as field managers, and MRS. BLANCHE MCRAE, who will serve on the sales staff in the Atlanta office. Mr. White will have headquarters in Nashville, Tennessee.

Robert H. Taylor has been named engineer for the Stran-Steel Division. A graduate of Georgia Tech, Mr. Taylor is a licensed and registered structural and design engineer.

Georgia Power Expansion

THE GEORGIA POWER COMPANY will invest more than \$34,000,000 in new generating, transmission and distribution facilities in 1954, Harilee Branch, Jr., president, announced recently.

Of the \$34,000,000, nearly \$13,000,000 will be spent on power plants. Most of this amount will go towards

the completion of the first two 100,000 kw steam-electric generating units at Plant Hammond on the Coosa river near Rome and for further work on a third unit of the same size. The first two units of Plant Hammond are scheduled to go into operation during 1954. The third unit will be completed in 1955.

A part of the money appropriated for generating facilities will be spent on engineering for two additional hydroelectric units of 5,000 kw each to be installed at the company's Goat Rock plant on the Chattahoochee river above Columbus. The two units will increase the capacity of this plant to 31,000 kilowatts. Actual construction at Goat Rock will begin in 1955.

More than \$6,000,000 will be invested in new transmission lines and substations. This work includes several major power lines to connect Plant Hammond with the company's statewide transmission system. These 110,000 volt lines will radiate from Plant Hammond to transmission substations located at Lindale, Bremen, Aragon and Norcross. The construction of these lines will make additions and changes necessary at the Lindale, Bremen and Aragon substations.



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A letter from you will bring an assortment of the business cards we have made for others.

THE JOHN B. WIGGINS CO.
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Peerless Book Form
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Koppers Expands—Baltimore

Construction of a new mechanical development laboratory devoted to the refinement and adaptation of present products and processes plus the development of new products for the Metal Products Division of KOPPERS COMPANY, INC., was announced recently.

The new laboratory will be located at Koppers' South Baltimore Plant. Personnel and operations will be directed by John W. Pennington, Manager of the Division's Technical Department.

Orr & Sembower—Carolinas

ORR & SEMBOWER, INC., Reading, Pa., has announced the appointment of CHARLES M. SETZER & CO., Box 1867, CHARLOTTE, NORTH CAROLINA, as sales and service representative handling Powermaster packaged automatic boilers in central North Carolina and in the northern part of South Carolina.

C. M. SETZER, JR., is in charge of activities at Charlotte and ROWE A. MAUNEY operates from Marion, North Carolina.

New Warehouse & Offices for Whitney Chain Co.—Atlanta

THE WHITNEY CHAIN COMPANY, ATLANTA, GEORGIA, is expanding its service to Southern industry through the addition of a modern warehouse building at 554 Deering Road, Northwest. The new warehouse is specifically designed for efficient stocking and handling of power transmission products. It is completely air conditioned.

GLENN E. TINSLEY, District Manager, will have the added responsibility of directing the Atlanta Warehouse. The new building will house Whitney district headquarters in addition to its warehouse activities.

Fram Buys Tulsa Company

FRAM CORPORATION, Providence, R. I., has announced the purchase of the WARNER LEWIS COMPANY of TULSA, OKLAHOMA, to be known as the Warner Lewis Company, Division of Fram Corporation.

The wholly owned subsidiary company specializes in liquid fuel separators, filters and meter calibrating tanks. Facilities at Tulsa include office, engineering and manufacturing buildings, and additional fabricating facilities at Sand Springs, Oklahoma.

The Liquid Separator Division of Fram, located at RICHMOND, VIRGINIA, will be transferred to Warner Lewis at Tulsa within the next few months.

Power Conference—Chicago

The sixteenth annual meeting of the AMERICAN POWER CONFERENCE will be held on March 24, 25 and 26, 1954, at the Sherman Hotel in Chicago. The Conference is sponsored by the Illinois Institute of Technology in co-operation with twelve universities and ten local and national engineering societies.

The purpose of the Conference is to provide a forum for the exchange of information in the fields of power generation, transmission, distribution and utilization. All persons interested are invited to attend. For further information, write to E. R. Whitehead, Secretary, American Power Conference, Illinois Institute of Technology, Technology Center, Chicago 16, Ill.

News of Manufacturers

COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE COMPANY, Erie 4, Pa., announces the appointment of John A. Vanyo, Jr., as Assistant Sales Manager; O. H. Keeling as Manager of Combustion Control; and R. L. Bruce as Senior Contract Engineer. Don Allhouse, who has been advertising manager of the Division since its formation in 1952, has been appointed General Advertising Manager for the company to handle all advertising, with offices in both Erie and Pittsburgh.

THE JEFFREY MANUFACTURING CO., Columbus 16, Ohio, has made the following personnel changes: L. H. McReynolds, who has been with the company for 33 years, is now Manager of Public Relations, replacing W. B. Montague who resigned recently. A. D. Mahoney, with 39 years service, continues as Sales Promotion Manager. Nevin J. Rodes has joined the company to take charge of Trade Paper Advertising.

NORTON COMPANY, Worcester, Mass., announces two appointments in its refractory sales organization: William F. Winemiller is now manager of the sales engineering department, and James L. Miller has been appointed a refractories engineer, responsible for a new territory which includes Missouri.

NOW REMOVE SCALE, RUST

By Chemical
Circulation
Method

*It's safer,
faster, easier*

Don't rod out lime scale from equipment—dissolve it with Oakite Compound No. 32.

Oakite Compound No. 32 is a liquid acidic material to which you add water. It dissolves lime scale and rust when circulated through equipment. In most cases dismantling of equipment is unnecessary. Oakite Compound No. 32 does a more efficient job than mechanical methods because it flows into areas inaccessible to rod and drill. Use Oakite Compound No. 32 for descaling!

- Diesel Engines
- Condensers
- Heat Exchangers
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MATERIALS • METHODS • SERVICE

Technical Service Representatives in
Principal Cities of U. S. and Canada

WHAT'S NEW and Where to Get It

Free literature on the latest developments in equipment and supplies is offered by leading manufacturers. For your copy, circle the item number on one of the reader service post cards provided on pages 17 and 18.

O-1 RADIATION Bulletin 5308, 2 pages—Describes Moore Fin Radiation (steel piping) for efficient heating and cooling systems at low cost. Chart gives sizes and ratings. Discusses applications in factory heating systems, dry kiln heating systems, steam and hot water coils, air conditioning, heat exchangers, etc.—MOORE DRY KILN COMPANY, 1228 W. State St., Jacksonville 1, Fla.

O-2 INDUCED DRAFT BLOWER Bulletin KIDB-H-53, 4 pages—Illustrates "packaged" unit, entirely automatic in operation, for easy installation, with electrical controls in separate cabinet; describes applications—KIRCO BOILER & ENGINEERING CO., 2409-2416 DeKalb St., St. Louis 4, Mo.

O-3 GAGES AND VALVES—Unit No 218, 4 pages—Describes liquid level gages, valves and specialties for chemical and petrochemical processing. Discusses design, construction, and operation of equipment, with photographs of typical installations—JERGUSON GAGE & VALVE COMPANY, 80 Fellsway, Somerville 45, Mass.

O-4 ROTARY JOINTS—Bulletin, 4 pages—Illustrates and describes Phillips packless leakproof rotary joints. Cutaway drawings show typical installation with supply and return circulation; and installation of Type S joint with siphon pipe in place.—KEY COMPANY, Exclusive Distributors, P. O. Box 494, East St. Louis, Ill.

O-5 COMPRESSORS—Bulletin No. 132, 4 pages—Describes the company's turbo-charged, 2-cycle, right angle compressor; illustrates model with 8 vertical power cylinders and 4 horizontal compressor cylinders. Tabulates new features and sizes available.—CLARK BROS. CO., Olean, N. Y.

O-6 CENTRIFUGAL PUMPS—Catalog No. 253, 32 pages—Covers stainless steel centrifugal pumps, including engineering data, performance curves, capacity charts, seal application, with illustrations and other pertinent information.—TRICLOVER MACHINE CO., Kenosha, Wis.

O-7 DIATOMITE FILTERS—Bulletin No. 2265, 4 pages—Explains use of diatomite filters in filtering oil from con-

taminated water, and to filter out undesirable organisms. Gives specifications, illustrates typical installation, and cutaway view of the filter.—GENERAL FILTER COMPANY, 923 Second St., Ames, Iowa.

O-8 PRESSURE GAUGES—Ashcroft Gauge Catalog, 124 pages—Includes information on pressure gauges, gauge accessories, and gauge engineering. Sectionalized by product lines, fully indexed, with selector tables for all gauges. Illustrated with photographs and line drawings—MANNING, MAXWELL, & MOORE, INC., Stratford, Conn.

O-9 DUST CONTROL—Manual, 8 pages—A Simplified Test Method for Dust Control Determination to get reliable information on the range of the plant's dust control problem, conducted under actual operating conditions, is presented. Includes installational photographs and other illustrations.—DUSTEX CORP., P. O. Box 2520, Buffalo 25, N. Y.

O-10 SCALE REMOVAL—Bulletin 154-13M, 2 pages—Discusses removing scale from water and gas lines by use of liquid chemical solvents. Gives typical problem, method, and results, and lists various applications in gas mains, cooling water piping system, feedwater line, salt water mains, sewer lines, etc.—DOWELL, INCORPORATED, P. O. Box 536, Tulsa 1, Okla.

O-11 ELECTRIC HEAT APPLICATION—Chromalox Booklet, 32 pages—Lists "101 Ways to Apply Electric Heat" in industry. Case histories show plant experience in application of metal-sheathed electric heating units. Illustrated with photographs and diagrams.—EDWIN L. WIEGAND CO., 7563 Thomas Blvd., Pittsburgh 8, Pa.

O-12 CELLULAR GLASS INSULATION—A.I.A. File 37B, 24 pages—Lists specifications for application of Foamglas in



New Clay Products Plant—Meridian, Miss.

W. S. DICKEY CLAY MANUFACTURING COMPANY'S new \$2,600,000 clay products plant in Meridian, Miss., with an estimated annual production capacity of 36,000 tons, is now in full operation. Plant has ten periodic (beehive) kilns and one continuous tunnel kiln.

Clay sewer pipe in the 4, 6 and 8" sizes is made on horizontal machines, the newest development in pipe extrusion. The larger diameter pipe (10 to 36") is also processed almost completely automatically. New type hydraulic presses form this pipe at 600 psi, giving the product extremely dense body and greater strength.

Dickey's new plant will also produce vitrified wall coping, flue lining, drain tile, filter-bed blocks, septic tanks and flashing blocks. LEE CAMPBELL is manager, and J. R. MILLER, superintendent of the new Meridian, Miss., plant. Other Dickey plants are located at Pittsburg, Kansas; Texarkana, Texas-Arkansas; Birmingham, Ala.; San Antonio, Texas; and Chattanooga, Tenn.

LONGER LASTING BOILER FURNACES

Boiler furnaces lined with CARECO last two to four times longer than those lined with fire brick. Write for quotation.

CAROLINA REFRactories COMPANY
HARTSVILLE, S. C.

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IN STOCK -- IMMEDIATE SHIPMENT

Complete range of indoor and outdoor sheet stock colors in all standard sizes and thicknesses. Can

also furnish extruded Plexiglas Sheets, Rods and Tubing from stock, and can extrude custom shapes in plexiglas and other plastics.



The Southwest's Largest Plexiglas Distributor

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Write for Free Card of Actual Colored Plexiglas Samples with Latest Stock and Price List.

1404 Henderson, Ft. Worth, Tex.
div. of Air Accessories, Inc.

WHAT'S NEW and Where to Get It (continued)

walls, ceilings, floors, roofs, perimeters, and in low temperature space insulation in industrial plants. Physical properties, characteristics, and performance data are covered. — PITTSBURGH CORNING CORPORATION, One Gateway Center, Pittsburgh 22, Pa.

O-13 WIREBOUND PACKAGING—"What to Expect from Wirebound"—Describes wirebound shipping containers, with construction principles, advantages, and illustrations to accompany case histories showing wirebound boxes, crates, and pallet boxes in actual use. — WIREBOUND BOX MANUFACTURERS ASSOCIATION, 327 S. LaSalle St., Chicago 4, Ill.

O-14 V-BELTS—Catalog, 8 pages—Describes the new patented Veclos TD and TE adjustable V-belt for D and E drives, featuring such advantages as being easier to couple and uncouple; greater strength and durability; and rubber coating. Studs, cup washers and T-screws are illustrated in detail. Installation and operation are explained, with accompanying photographs. — MANHEIM MANUFACTURING & BELTING CO., Manheim, Pa.

O-15 TURBINE PUMPS—Bulletin 161—Describes vertical turbine pumps for the safe and efficient handling of all petroleum products and other volatile fluids, with capacities ranging from 40 gpm to 4,000 gpm, and more for special service. Construction features and advantages are covered. — LAYNE & HOWLER, INC., P. O. Box 6697, Memphis 8, Tenn.

O-16 ELECTRICAL DISTRIBUTION—Bulletin No. 35, 28 pages—Describes new 225, 375, and 500 amp trolley busway electrical distribution systems for use with heavy duty cranes and hoists, machine tools, conveyor assembly lines, etc. Covers typical installations, including planning and procedure, methods of mounting, and equipment descriptions. — FEEDRAIL CORPORATION, 125 Barclay St., New York 7, N. Y.

O-17 ELECTRIC POWER DRIVES—Scale Drawings, 22 sheets—New set of scale drawings for geared Slo-Speed Electric Power Drives is available to design engineers, draftsmen, and layout engineers. Three views are detailed on each page with the frame and type drawn to three separate scales, including ratings from $\frac{1}{2}$ hp to 30 hp. — STERLING ELECTRIC MOTORS, INC., 5401 Telegraph Road, Los Angeles 22, Calif.

O-18 OIL & GAS BURNERS—Bulletin OB-53, 28 pages—Covers principles involved in selection and application of various types of burners for oil or gas or a combination of the two for standard range

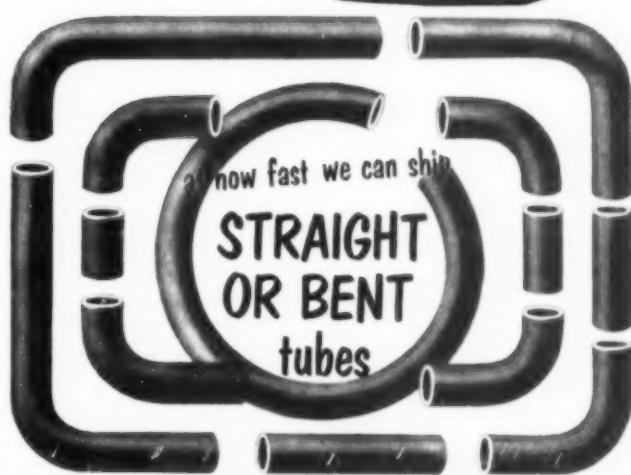
and prices of all G-E indoor and outdoor potential and current transformers. Listings of ratio and phase-angle tests, together with tables covering mechanical and thermal limits of current transformers, are included. — GENERAL ELECTRIC COMPANY, Schenectady 5, N. Y.

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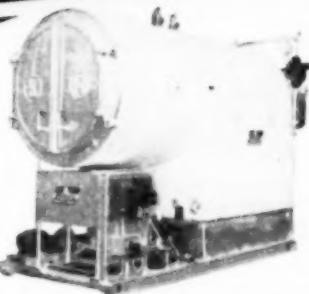
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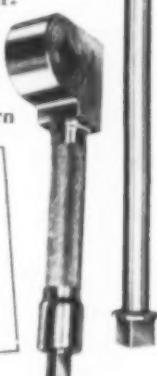
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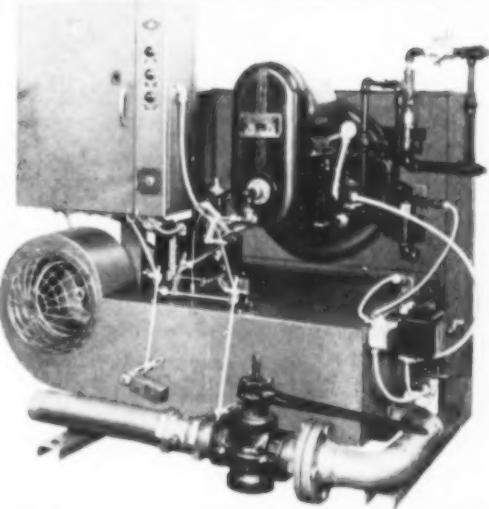
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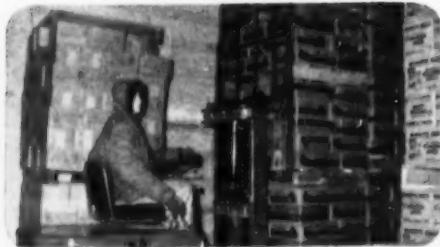
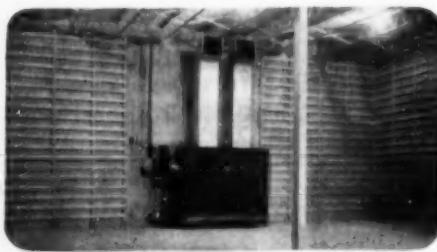


Refrigeration"

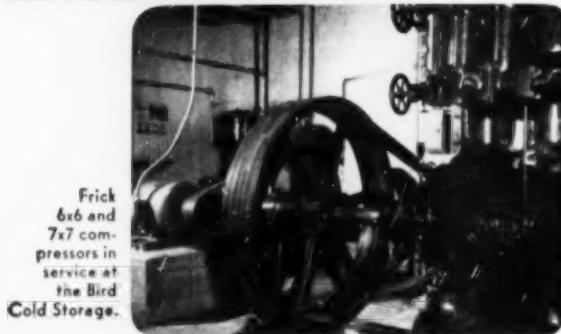
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6x6 and
7x7 com-
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the Bird
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for lower cost control

of moderately **Corrosive** fluids

Fig. 2651-A Gate

JENKINS
NICKEL IRON
Valves with Type 316
STAINLESS STEEL

Trim



Fig. 2624 Swing Check

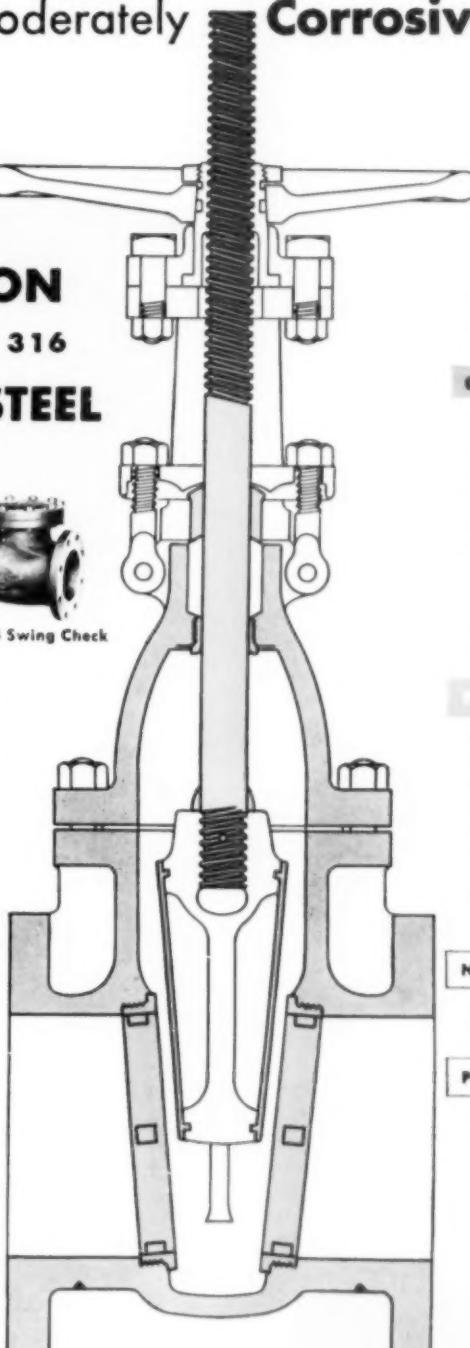
This combination provides corrosion resistance well above the moderate need in many processing services with an investment well below that for all-stainless steel valves.

Designed primarily for the chemical process industries, they are recommended for control of mildly corrosive liquids with minimum quantities of mineral acids, such as creosote in wood treatment, and many liquids carried in petroleum processing.

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- **COVER** In Check Valve.

Type 2651A Stainless Steel

- **SPINDLE**
- **GLAND**
- **BONNET BUSHING**
- **SPINDLE RING**
- **WEDGE PIN**
- **WEDGE RINGS** Rolled into Nickel Iron Wedge in 10" to 24" sizes.
- **SEAT RINGS**
- **DISC and HANGER** in Check Valve

NI-RESIST Type No. 2

- **WEDGE** of I-beam structure is solid NI-RESIST in 2" to 8" sizes.

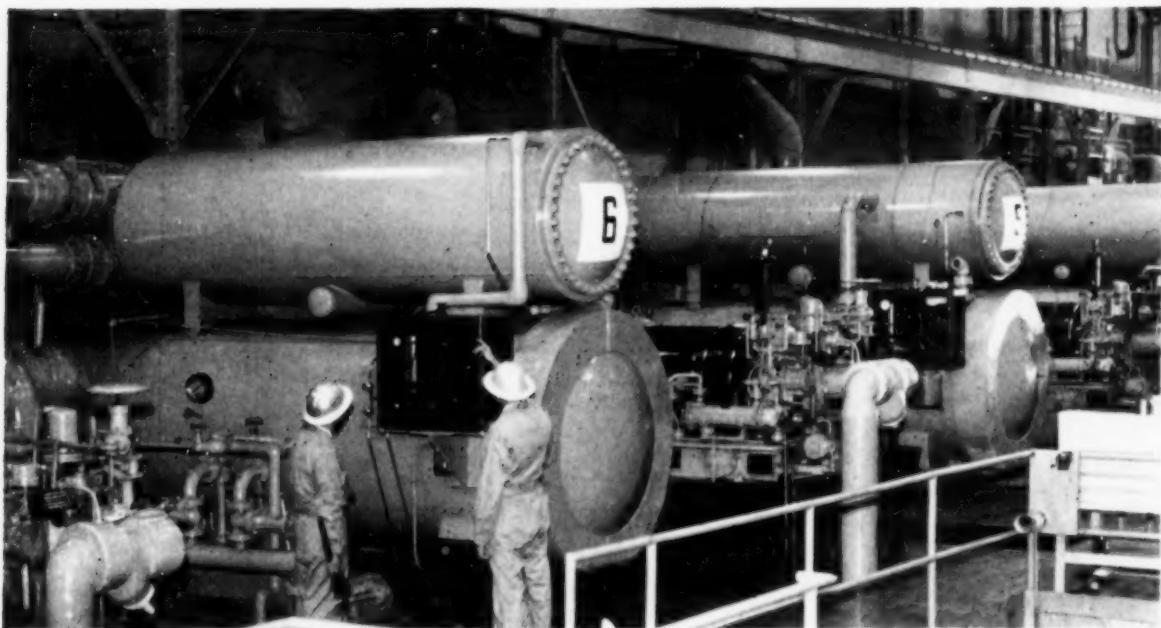
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VALVES SINCE 1864 TRADE JENKINS MARK
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Boilers • Condensers • Heat Exchangers • Cooling Systems
Pipe Lines • Piping Systems • Gas Washers • Process Towers
Process Equipment • Evaporators • Filter Beds • Tanks
Chemical Services for Oil, Gas and Water Wells

DOWELL INCORPORATED • TULSA 1, OKLAHOMA

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